HPC Wireless Services
22 Shelter Rock Lane.
Building C
Danbury, CT, 06810
P.: 203.797.1112

HPC
WIRELESS SERVICES

December 27, 2013

VIA OVERNIGHT COURIER

Connecticut Siting Council
10 Franklin Square
New Britain, Connecticut 06051
Attn: Ms. Melanie Bachman, Acting Executive Director

Re: Sprint Spectrum, L.P. – Exempt Modification
20 Barnabas Road, Newtown (aka Newton), Connecticut

Dear Ms. Bachman:

This letter and attachments are submitted on behalf of Sprint Spectrum, L.P. ("Sprint"). Sprint is undertaking modifications to certain existing sites in its Connecticut system in order to implement updated technology. Please accept this letter and attachments as notification, pursuant to R.C.S.A. Section 16-50j-73, of construction that constitutes an exempt modification pursuant to R.C.S.A. Section 16-50j-72(b)(2). In compliance with R.C.S.A. Section 16-50j-73, a copy of this letter and attachments is being sent to the First Selectman of the Town of Newtown.

Sprint plans to modify the existing wireless communications facility owned by The Connecticut Light and Power Company and located at 20 Barnabas Road, Newtown (aka Newton) (coordinates 41°-25'-40" N, 73°-20'-37.4" W). Attached are plan and elevation drawings depicting the planned changes, and documentation of the structural sufficiency of the structure to accommodate the revised antenna configuration. Also included is a power density report reflecting the modification to Sprint's operations at the site.

The changes to the facility do not constitute a modification as defined in Connecticut General Statutes ("C.G.S.") Section 16-50i(d) because the general physical characteristics of the facility will not be significantly changed. Rather, the planned changes to the facility fall squarely within those activities explicitly provided for in R.C.S.A. Section 16-50j-72(b)(2).

1. Sprint will initially remove four (4) of the existing twelve (12) CMDA antennas and add three (3) dual-band panel LTE antennas on three (3) existing pipe masts/10' boom gates, and six (6) RRHs (remote radio heads), all at a centerline height of approximately 91' AGL. During an interim period of up to one year, the remaining eight (8) existing CDMA antennas will remain. For the final configuration, a total of six (6) existing CDMA antennas will be removed, and six (6) will remain on three (3) new dual

poles. Sprint will also install three (3) hybriflex cables along the existing coaxial cable run, and will remove six (6) of the original twelve (12) coaxial cables on the Tower leg for the interim period, and a total of nine (9) of the original coaxial cables from the Tower leg at the end of the interim period. Three (3) of the original coaxial cables on the face of the Tower will remain. These proposed modifications will not extend the height of the approximately 180' structure.

2. Sprint will remove and replace related equipment in the existing Equipment Shelter. Sprint will also replace the existing GPS antenna with another GPS antenna. These changes will have no effect on the site boundaries.

3. The proposed changes will not increase the noise level at the existing facility by six decibels or more. The incremental effect of the proposed changes will be negligible.

4. The changes to the facility will not increase the calculated "worst case" power density for the combined operations at the site to a level at or above the applicable standard for uncontrolled environments as calculated for a mixed frequency site. As indicated on the attached report prepared by EBI Consulting, Sprint's operations at the site will result in a power density of approximately 37.390%; the combined site operations will result in a total power density of approximately 60.510%.

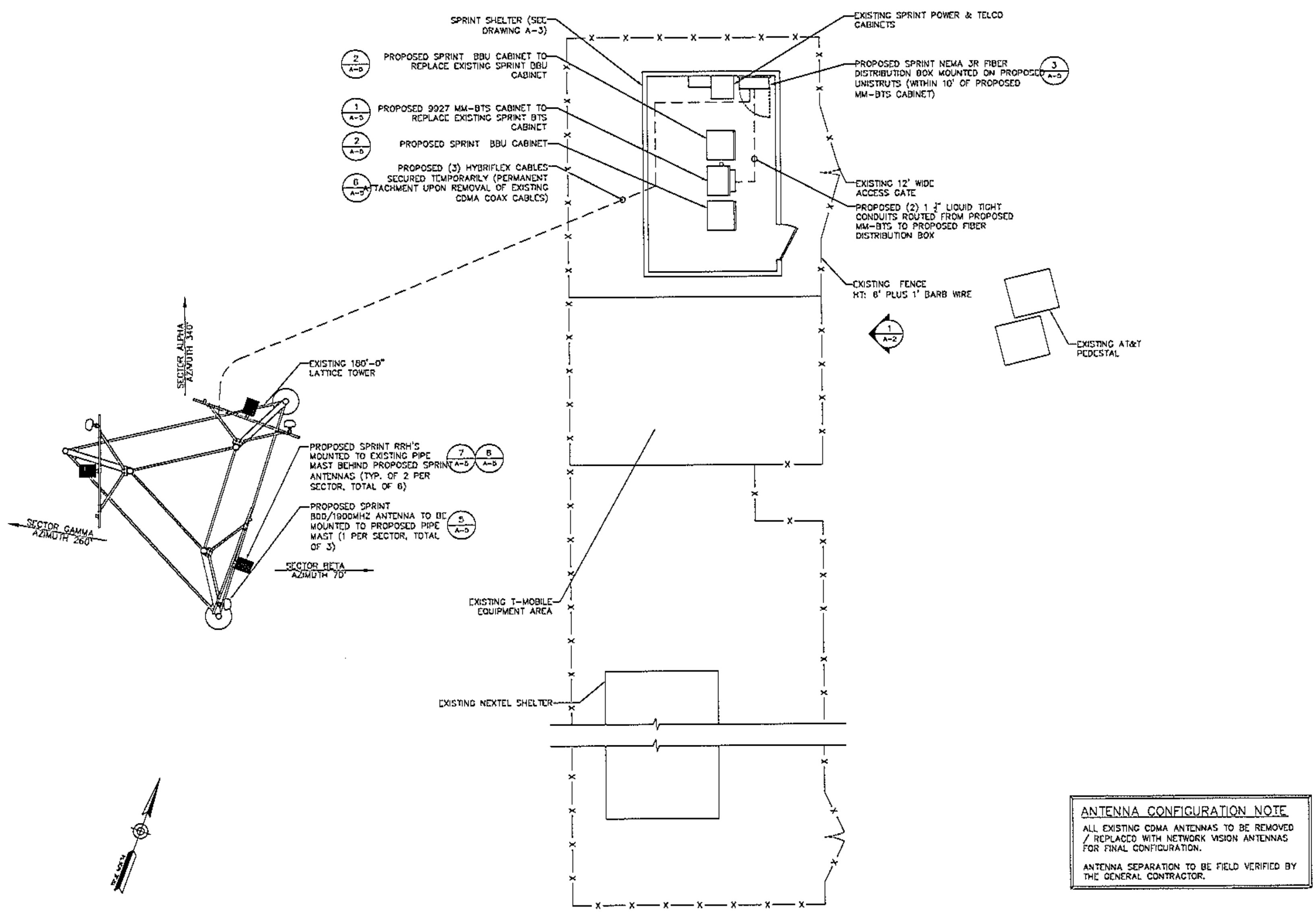
Please contact me by phone at (203) 610-1071 or by e-mail at mjhowlett@optonline.net with questions concerning this matter. Thank you for your consideration.

Respectfully yours,

Melanie J. Howlett

Attachments

cc: Honorable Patricia LLodra, First Selectman, Town of Newtown
Connecticut Light and Power Company (underlying property owner)



ANTENNA CONFIGURATION NOTE

ALL EXISTING CDMA ANTENNAS TO BE REMOVED / REPLACED WITH NETWORK VISION ANTENNAS FOR FINAL CONFIGURATION.

ANTENNA SEPARATION TO BE FIELD VERIFIED BY THE GENERAL CONTRACTOR.

1 COMPOUND PLAN
SCALE = 0.020833

Sprint VISION
1 INTERNATIONAL BLVD, SUITE 800
MAHWAH, NJ 07495
P: 800-357-7641

Alcatel·Lucent
600-700 MOUNTAIN AVE
MURRAY HILL, NJ 07974

Sa Salient ARCHITECTS, LLC
New Jersey Office:
8 East Palisade Avenue
Englewood, NJ 07631
P: 201-[illegible] F: 201-507-9660

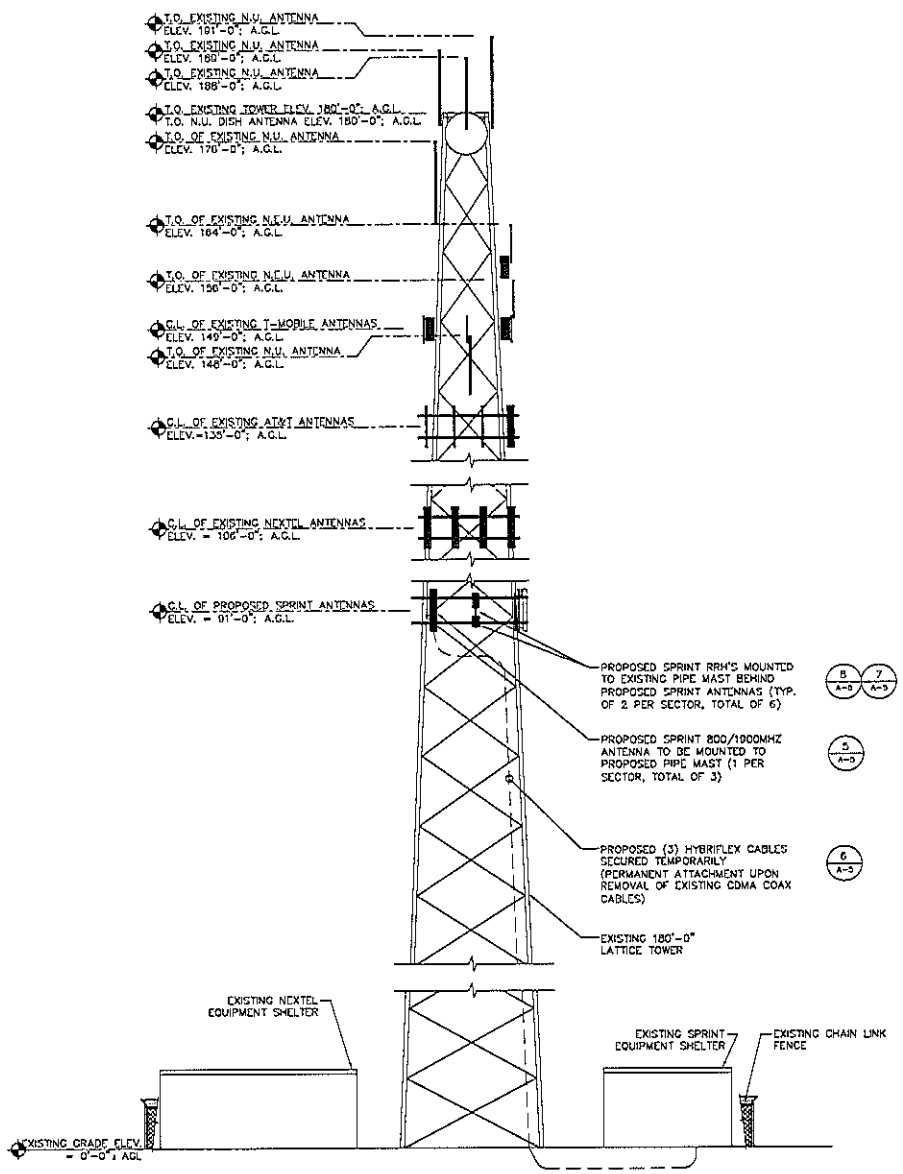
SUBMITTALS

NO	DATE	DESCRIPTION	BY
1	04/06/12	PRELIMINARY	PJP
2	06/26/12	REVISED PER COMMENTS	NAS
3	10/30/13	ISSUED AS FINAL	AD
4	11/27/13	STRUCTURAL ANALYSIS COORD.	ANA

SITE NUMBER: CT03XC383
SITE NAME: NEWTOWN / HAWLEYVILLE (CL&P)
SITE ADDRESS: 20 BARNABAS ROAD NEWTON, CT 06470

SHEET TITLE: COMPOUND PLAN

SALIENT PROJ. NO: CT03XC383
SHEET NO: A-1
DATE:
CHECKED BY: ADC



1 EAST ELEVATION
SCALE = 1/8" = 1'-0"

STRUCTURAL VERIFICATION BY GENERAL CONTRACTOR:

GENERAL CONTRACTOR TO REFER TO THE STRUCTURAL ANALYSIS REPORT PREPARED BY CENTEK ENGINEERING, DATED MARCH 28, 2013

1. EXISTING ANTENNA MOUNT ASSEMBLY MEMBER SIZES AND CONNECTIONS ARE ASSUMED TO BE AS SHOWN ON THE ORIGINAL CONSTRUCTION DOCUMENTS. GENERAL CONTRACTOR TO VERIFY THE ABOVE IN THE FIELD AND REPORT ANY VARIANCES TO THE ENGINEER OF RECORD PRIOR TO ANY INSTALLATION WORK BEING PERFORMED.

2. IT IS THE GENERAL CONTRACTOR'S/INSTALLER'S RESPONSIBILITY, PRIOR TO INSTALLATION OF THE EQUIPMENT TO INSPECT AND VERIFY THAT THE EXISTING ANTENNA MOUNT ASSEMBLY IS IN GOOD CONDITION, IN GOOD WORKING ORDER, AND INSTALLED ACCORDING TO THE MANUFACTURER'S ASSEMBLY DRAWINGS AND SPECIFICATIONS. IF ANY COMPONENTS ARE FOUND TO BE DEFECTIVE, INCLUDING MISSING OR LOOSE BOLTS/ANCHORS, REPORT SUCH DEFECTS IMMEDIATELY, AND DO NOT PROCEED WITH INSTALLATION UNTIL THE DEFECTS HAVE BEEN CORRECTED.

ANTENNA CONFIGURATION NOTE

ALL EXISTING CDMA ANTENNAS TO BE REMOVED / REPLACED WITH NETWORK VISION ANTENNAS FOR FINAL CONFIGURATION.

ANTENNA SEPARATION TO BE FIELD VERIFIED BY THE GENERAL CONTRACTOR.

NOTE:

ANTENNA BUSS BARS SHOULD BE INSTALLED DIRECTLY TO TOWER STEEL WITHOUT INCLUDING INSULATORS OR DOWN CONDUCTORS.

NOTES:

SEE LATTICE TOWER NOTES ON GN-2

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P: 800-357-7641

Alcatel-Lucent
600-700 MOUNTAIN AVE
MURRAY HILL, NJ 07974

Salient ARCHITECTS, LLC
New Jersey Office:
8 East Palisade Avenue
Englewood Cliffs, NJ 07631
P: 201-567-9550

1/22/13

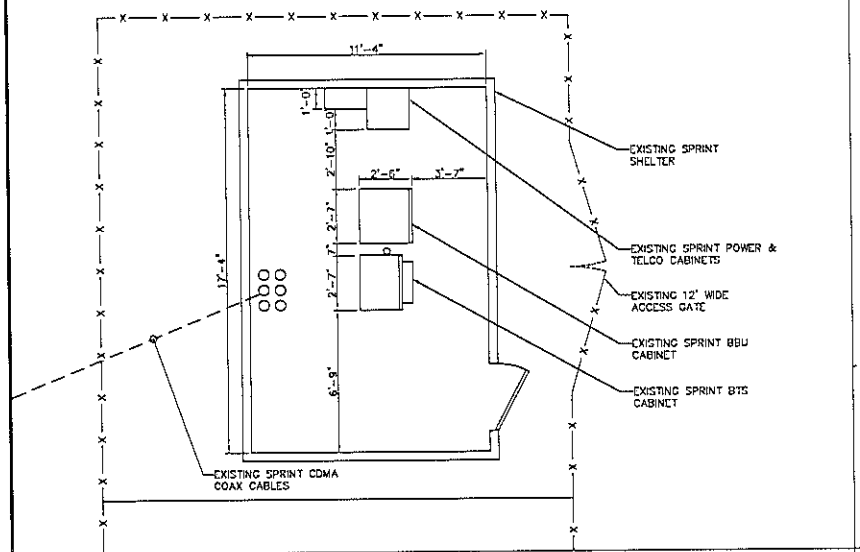
SUBMITTALS

NO	DATE	DESCRIPTION	BY
1	04/06/12	PRELIMINARY	PJP
2	06/26/12	REVISED PER COMMENTS	NAS
3	10/30/13	ISSUED AS FINAL	AD
4	11/27/13	STRUCTURAL ANALYSIS COORD.	ANA

SITE NUMBER:
CT03XC383
SITE NAME:
NEWTOWN / HAWLEYVILLE (CL&P)
SITE ADDRESS:
20 BARNABAS ROAD
NEWTON, CT 06470

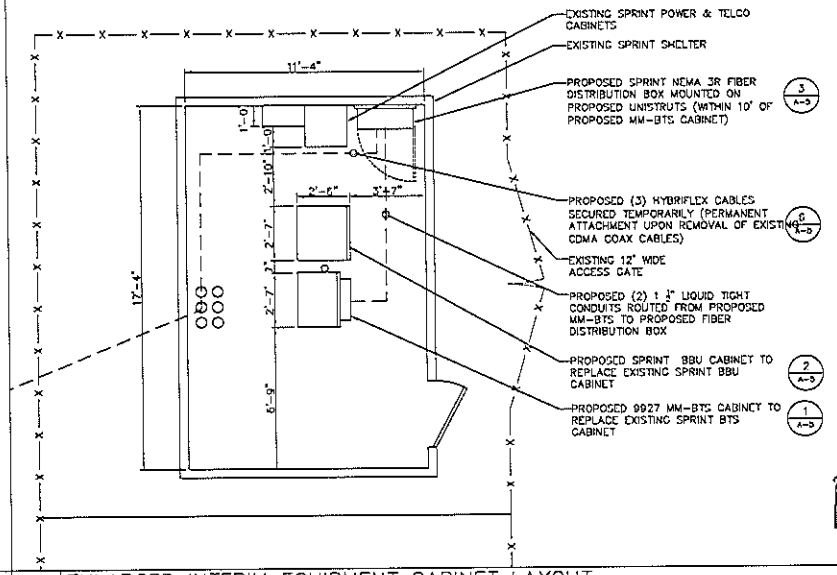
SHEET TITLE:
ELEVATION

SALIENT PROJ. NO.
CT03XC383
DATE:
CHECKED BY:
ADC
SHEET NO:
A-2



1 ENLARGED EXISTING EQUIPMENT CABINET LAYOUT

SCALE = 3/8"=1'-0"



2 ENLARGED INTERIM EQUIPMENT CABINET LAYOUT

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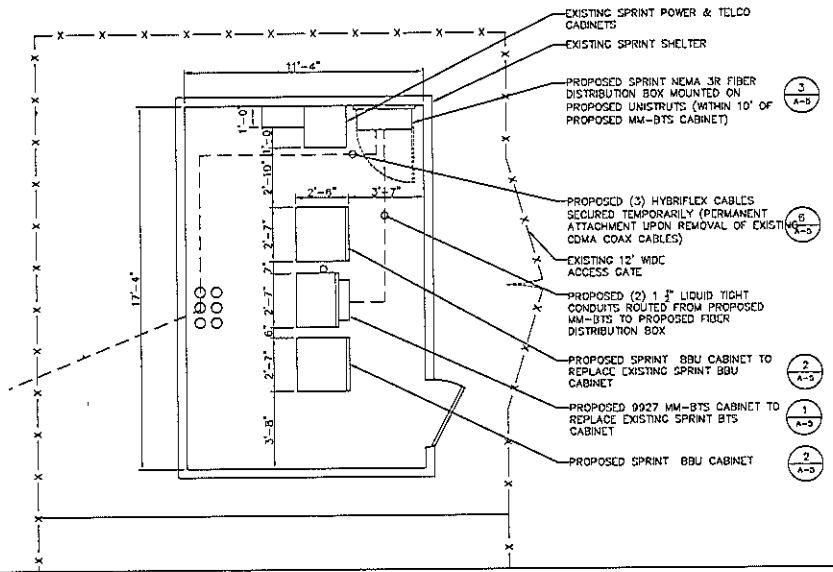


3 ENLARGED FINAL EQUIPMENT CABINET LAYOUT

SCALE = 3/8"=1'-0"

Sprint VISION
1 INTERNATIONAL BLVD, SUITE 800
MAHWAH, NJ 07495
P: 000-357-7441

Alcatel·Lucent
600-700 MOUNTAIN AVE
MURRAY HILL, NJ 07974

Salient ARCHITECTS, LLC
New Jersey Office:
8 East Palisade Avenue
Englewood, NJ 07631
P: 201-569-0070 F: 201-567-9560

STATE OF CONNECTICUT · PAUL J. GIONFRIDDO · No. 22506 · LICENSED PROFESSIONAL ENGINEER

P.E.

SUBMITTALS

NO	DATE	DESCRIPTION	BY
1	04/06/12	PRELIMINARY	PJP
2	06/26/12	REVISED PER COMMENTS	NAS
3	10/30/13	ISSUED AS FINAL	AD
4	11/27/13	STRUCTURAL ANALYSIS COORD.	ANA

SITE NUMBER:
CT03XC383

SITE NAME:
NEWTOWN / HAWLEYVILLE (CL&P)

SITE ADDRESS:
20 BARNABAS ROAD
NEWTON, CT 06470

SHEET TITLE:
ENLARGED EQUIPMENT CABINET LAYOUT

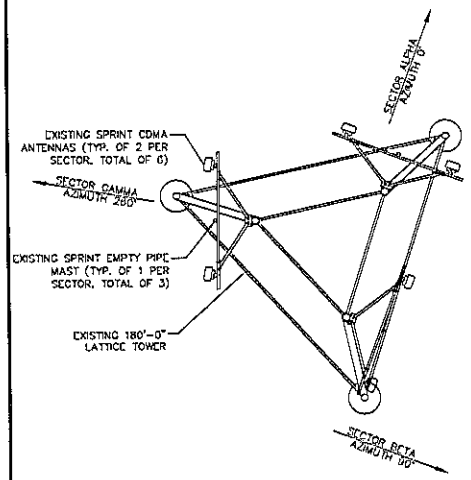
SALIENT PROJ. NO: CT03XC383

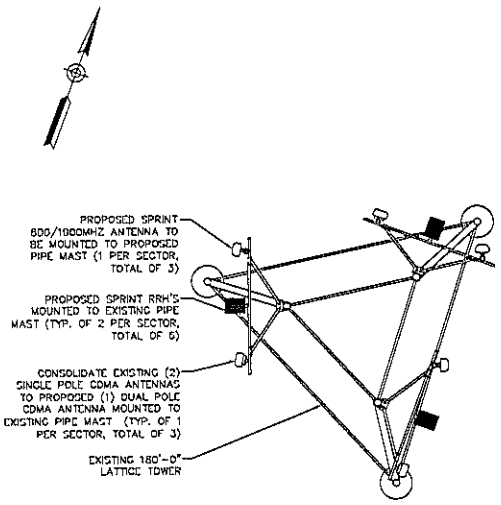
DATE:

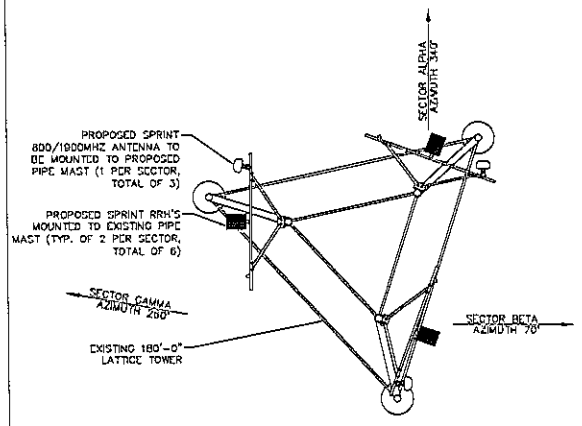
DRAWN BY: ADC

SHEET NO: A-3

EXISTING ANTENNA PLAN	INTERIM ANTENNA PLAN	FINAL ANTENNA PLAN







1 ANTENNA SCENARIO

SCALE = N.T.S.

	POSITION	ANTENNA STATUS	FREQUENCY (MHZ)	ANTENNA MAKE	ANTENNA MODEL	AZIMUTHS EXISTING (FOR REFERENCE)	AZIMUTHS PROPOSED	MECHANICAL DOWN TILT	ELECTRICAL DOWN TILT	RAD CENTER (A.G.L.)	*HYBRIFLEX CABLE LENGTH (FT)	RRH MODEL	TOP COAX JUMPER SIZE (IN.)	*TOP COAX JUMPER LENGTH (FT.)	TOP COAX JUMPER MAKE	TOP COAX JUMPER MODEL	COMBINER	*COMBINER JUMPER LENGTH (FT.)	ANTENNA COLOR CODING
ALPHA	A-1	PROPOSED	800/1900	RFS	APXVSPP18-C-A20	0°	340°	0°	-1°	91'-0"	170	(1) 800MHz	1/2	10	N/A	(2) LCF12-50J	--	--	TBD
								0°	0°			(1) 1900MHz	1/2	10	N/A	(4) LCF12-50J	--	--	
BETA	B-1	PROPOSED	800/1900	RFS	APXVSPP18-C-A20	90°	70°	0°	-4°	91'-0"	170	(1) 800MHz	1/2	10	N/A	(2) LCF12-50J	--	--	TBD
								0°	0°			(1) 1900MHz	1/2	10	N/A	(4) LCF12-50J	--	--	
GAMMA	C-1	PROPOSED	800/1900	POWER WAVE	P40-16-XLPP-RR-A	250°	250°	0°	-2°	91'-0"	170	(1) 800MHz	1/2	10	N/A	(2) LCF12-50J	--	--	TBD
								0°	-1°			(1) 1900MHz	1/2	10	N/A	(4) LCF12-50J	--	--	

* CONTRACTOR TO FIELD VERIFY ALL CABLE/JUMPER LENGTHS AGAINST CURRENT B.O.M.

2 RF SYSTEM SCHEDULE

SCALE = N.T.S.

Sprint VISION
1 INTERNATIONAL BLVD, SUITE 800
MAHWAH, NJ 07495
P: 800-357-7641

Alcatel·Lucent
600-700 MOUNTAIN AVE
MURRAY HILL, NJ 07974

Salient ARCHITECTS, LLC
New Jersey Office:
8 East Palisade Avenue
Englewood, NJ 07631
P: 201-567-0058 F: 201-567-9566

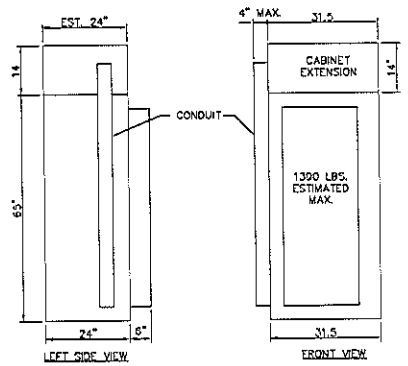
SUBMITTALS

NO	DATE	DESCRIPTION	BY
1	04/06/12	PRELIMINARY	PJP
2	08/28/12	REVISED PER COMMENTS	MAS
3	10/30/13	ISSUED AS FINAL	AD
4	11/27/13	STRUCTURAL ANALYSIS COORD.	ANA

SITE NUMBER:
CT03XC383
SITE NAME:
NEWTOWN / HAWLEYVILLE (CL&P)
SITE ADDRESS:
20 BARNABAS ROAD
NEWTON, CT 06470

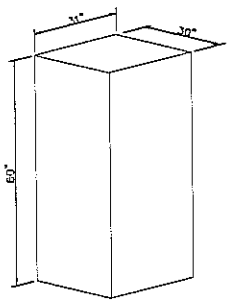
SHEET TITLE:
ANTENNA SCENARIO AND RF SYSTEM SCHEDULE

SALIENT PROJ. NO.: CT03XC383
DATE:
CHECKED BY: ADC
SHEET NO.: A-4



1 ALCATEL-LUCENT 9927 CABINET

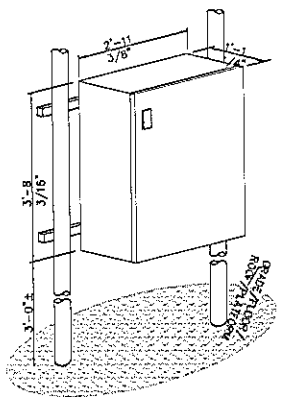
SCALE = N.T.S.



*WEIGHT WITH BATTERIES = 1625 LBS.

2 60ECv2 BBU CABINET

SCALE = N.T.S.



3 FIBER DISTRIBUTION BOX

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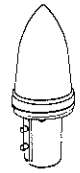


ANTENNA SPECIFICATIONS		
MODEL NO.	DIMENSIONS	WEIGHT
GPS-TMG-HR-26N	5"Hx3.2"DIA.	0.6 LBS.

*ALL MOUNTING OPTIONS FIT PIPES OF 1"-1.45" MAX. DIA.

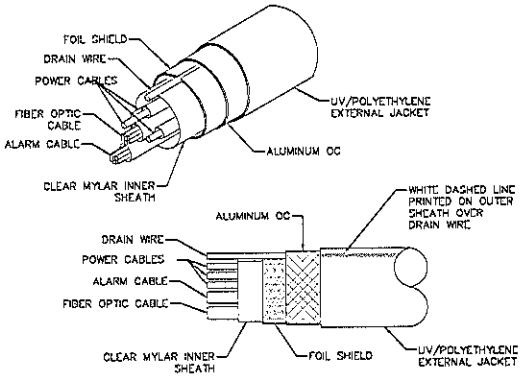
4 GPS ANTENNA

SCALE = N.T.S.

ANTENNA SPECIFICATIONS		
MODEL NO.	DIMENSIONS (HxWxD)	WEIGHT W/O MOUNTING HARDWARE
APXVSPP18-C-A20	72"x11.8"x7"	57 LBS.
P40-15-XLPP-RR-A	54"x17.4"x6.5"	53 LBS.

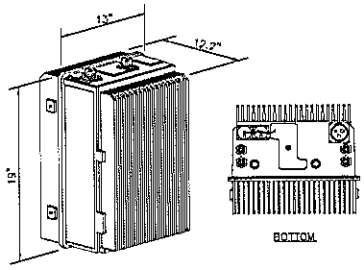
5 800/1900MHz ANTENNA

SCALE = N.T.S.



6 HYBRIFLEX CABLE

SCALE = N.T.S.



7 800MHz RRH

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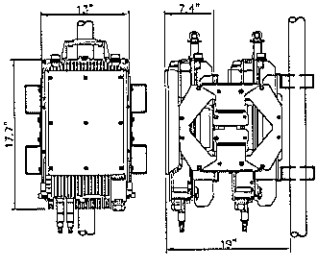

8 1900MHz RRH

SCALE = N.T.S.

9 NOT USED

SCALE = N.T.S.

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600-700 MOUNTAIN AVE
MURRAY HILL, NJ 07974

Salient ARCHITECTS, LLC
New Jersey Office:
P: 201-

SUBMITTALS

NO	DATE	DESCRIPTION	BY
1	04/05/12	PRELIMINARY	PJP
2	06/25/12	REVISED PER COMMENTS	NAG
3	10/30/13	ISSUED AS FINAL	AD
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SITE NUMBER:
CT03XC383

SITE NAME:
NEWTOWN / HAWLEYVILLE (CL&P)

SITE ADDRESS:
20 BARNABAS ROAD
NEWTON, CT 06470

SHEET TITLE:
TYPICAL DETAILS

SALIENT PROJ. NO: CT03XC383
DATE:
CHECKED BY: ADC
SHEET NO: A-5

CENTEK engineering

Centered on Solutions℠

Structural Analysis Report

180-ft Existing ROHN SSV Lattice Tower

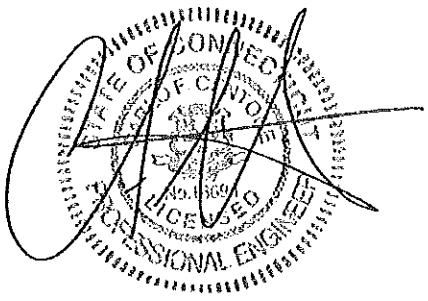
Proposed Sprint Antenna Modification

Sprint Site Ref: CT03XC383
Newtown

20 Barnabas Road
Newtown, CT 06470

Centek Project No. 12047.C06

Date: March 28, 2013



Prepared for:

Sprint Nextel
8 Airline Drive, Suite 105
Albany, NY 12205

63-2 North Branford Road, Branford, CT 06405 203.488.0580 Fax 203.488.8587 www.CentekEng.com

CENTEK Engineering, Inc.
Structural Analysis - 180-ft ROHN SSV Lattice Tower
Sprint Antenna Upgrade – CT03XC383
Newtown, CT
March 28, 2013

Table of Contents

CENTEK Engineering, Inc.
Structural Analysis - 180-ft ROHN SSV Lattice Tower
Sprint Antenna Upgrade – CT03XC383
Newtown, CT
March 28, 2013

Introduction

The purpose of this report is to summarize the results of the non-linear, P-Δ structural analysis of the antenna upgrade proposed by Sprint on the existing Northeast Utilities self supporting lattice tower located in Newtown, Connecticut.

The host tower is a 180-ft three legged, tapered steel lattice tower originally designed and manufactured by UNR-ROHN. The tower geometry and structure member sizes were obtained from a tower mapping report prepared by CSB Communications LLC, dated August 22, 2006 and a previous structural analysis and reinforcement design report prepared by Centek Engineering, Inc., project no. 11009.CO6 (Rev. 2), dated November 29, 2011. Foundation information was obtained from the reinforcement design drawings noted in the aforementioned Centek report. Sub-grade information was obtained from a geo-technical soils study prepared by Clarence Welti and Assoc., dated October 19, 2011.

Antenna and appurtenance inventory were obtained from a combination of the aforementioned Centek Engineering, Inc. structural analysis and reinforcement design report, information provided by Northeast Utilities System.

The existing tower consists of nine (9) tapered steel pipe leg sections conforming to ASTM A572-50. Diagonal lateral support bracing consists of single angle steel sections conforming to ASTM A36. All tower connections are bolted. The width of the tower face is 8.56-ft at the top and 24.86-ft at the base.

Sprint proposes the installation of three (3) panel antennas, six (6) Remote Radio Heads, (RRH's) and one (1) surge arrestor mounted on three (3) existing ROHN 10-ft boom gates. Refer to the Antenna and Appurtenance Summary below for a detailed description of the proposed antenna and appurtenance configuration.

Antenna and Appurtenance Summary

The existing tower supports several communication antennas. The existing and proposed loads considered in the analysis consist of the following:

- NEU (Existing):
  Antenna: One (1) RFS PD220 Omni-directional whip antenna pipe mounted to the top of the existing tower with a RAD center elevation of ±191-ft above grade level.
  Coax Cable: One (1) 7/8" Ø coax cable running on the face of the existing tower as specified in Section 3 of this report.
- NEU (Existing):
  Antenna: One (1) 8-ft Omni-directional whip antenna mounted to the top of the existing tower with a RAD center elevation of ±189-ft above grade level.
  Coax Cable: One (1) 1/2" Ø coax cable running on the face of the existing tower as specified in Section 3 of this report.

CENTEK Engineering, Inc.
Structural Analysis - 180-ft ROHN SSV Lattice Tower
Sprint Antenna Upgrade – CT03XC383
Newtown, CT
March 28, 2013

- NEU (EXISTING):
  Antenna: One (1) 10-ft 2 Bay dipole antenna mounted to the top of the existing tower with a RAD center elevation of ±188-ft above grade level.
  Coax Cable: One (1) 1/2" ∅ coax cable running on the face of the existing tower as specified in Section 3 of this report.
- NEU (Existing):
  Antenna: One (1) 6-ft Microwave dish antenna mounted to the leg of the existing tower with a RAD center elevation of ±180-ft above grade level.
  Coax Cable: One (1) EW63 elliptical coax cable running on the face of the existing tower as specified in Section 3 of this report.
- NEU (Existing):
  Antenna: One (1) 12-ft 2 Bay Dipole antenna mounted to the leg of the existing tower with a RAD center elevation of ±176-ft above grade level.
  Coax Cable: One (1) 1/2" ∅ coax cable running on the face of the existing tower as specified in Section 3 of this report.
- NEU (Existing):
  Antenna: Two (2) Andrew DB586 Omni-directional whip antennas (one upright, one inverted) and one (1) TTA mounted to the leg of the existing tower on a 3-ft stand-off with a RAD center elevation of ±160-ft above grade level.
  Coax Cable: Two (2) 7/8" ∅ coax cables running on the face of the existing tower as specified in Section 3 of this report.
- T-MOBILE (Existing):
  Antennas: Six (6) EMS RR-90-17-00DP panel antennas and six (6) TMA's mounted on three (3) 3-ft side arms with a RAD center elevation of ±149-ft above grade level.
  Coax Cables: Six (6) 1-5/8" ∅ coax cables running on the leg of the existing tower as specified in Section 3 of this report.
- NEU (Existing):
  Antenna: One (1) 10-ft 2 Bay Dipole antenna mounted on one (1) 3-ft side arm with a RAD center elevation of ±143-ft above grade level.
  Coax Cable: One (1) 1/2" ∅ coax cable running on the face of the existing tower as specified in Section 3 of this report.
- NEU (EXISTING):
  Antenna: One (1) 12-ft 2 Bay Dipole antenna mounted to the leg of the existing tower with a RAD center elevation of ±113-ft above grade level.
  Coax Cable: One (1) 7/8" ∅ coax cable running on the face of the existing tower as specified in Section 3 of this report.
- SPRINT/NEXTEL (Existing):
  Antennas: Twelve (12) Andrew/Decibel DB844H90EX-Y panel antennas mounted on three (3) existing 12-ft frame mounts with RAD center elevation of ±106-ft above grade level.
  Coax Cables: Twelve (12) 1-5/8" ∅ coax cables running on the face of the existing tower as specified in Section 3 of this report.

CENTEK Engineering, Inc.
Structural Analysis - 180-ft ROHN SSV Lattice Tower
Sprint Antenna Upgrade – CT03XC383
Newtown, CT
March 28, 2013

- SPRINT (EXISTING):
  Antennas: One (1) GPS antenna mounted on one (1) 1-ft side arm with RAD center elevation of ±62-ft above grade level.
  Coax Cables: One (1) 1/2" ∅ coax cable running on the leg of the existing tower as specified in Section 3 of this report.

- AT&T (EXISTING):
  Antennas: Three (3) P65-16-XLH-RR panel antennas, three (3) Kathrein 800-10121 panel antennas and six (6) Powerwave LGP21401 TMA's mounted on three (3) SitePro1 10-ft Lightweight T-Arms with a RAD center elevation of 135-ft above grade level.
  Radios: Six (6) Ericsson Remote Radio Units, Part No. RRUS-11 mounted to three (3) faces of the existing tower at a RAD center elevation of 135-ft above grade level.
  Surge Arrestor: One (1) Raycap DC6-48-60-18-8F Surge Arrestor mounted to the leg of the existing tower with a RAD center elevation of 135-ft above grade level.
  Coax Cables: Nine (9) 1-5/8" ∅ coax cables and one (1) 5/8" ∅ fiber optic cable and two (2) #8 DC control cables running within one (1) 3" ∅ flex conduit running on the leg of the existing tower as specified in Section 3 of this report.

- *SPRINT (Existing – To Remain for Interim Configuration):*
  Antennas: Four (4) Andrew/Decibel DB980F90E-M and two (2) Andrew/Decibel DB950G65E-M panel antennas mounted on three (3) existing 10-ft boom gates with a RAD center elevation of ±91-ft above grade level.
  Coax Cables: Six (6) 1-5/8" ∅ coax cables running on the leg of the existing tower as specified in Section 3 of this report.

- **SPRINT (PROPOSED – INTERIM CONFIGURATION):**
  Antennas: Two (2) RFS APXVSPP18-C-A20 panel antennas, one (1) Powerwave P40-16-XLPP-RR-A panel antenna, three (3) 1900MHz 4X45W RRH's and three (3) 800MHz 2X50W RRH's mounted on three (3) existing 10-ft boom gates with a RAD center elevation of ±91-ft above grade level.
  Coax Cables: Three (3) 1-1/4"∅ Hybriflex cables running on the leg of the existing tower as specified in Section 3 of this report.

- *SPRINT (Existing – To Be Removed for Final Configuration):*[1]
  Antennas: Four (4) Andrew/Decibel DB980F90E-M and two (2) Andrew/Decibel DB950G65E-M panel antennas mounted on three (3) existing 10-ft boom gates with a RAD center elevation of ±91-ft above grade level.
  Coax Cables: Six (6) 1-5/8" ∅ coax cables running on the leg of the existing tower as specified in Section 3 of this report.

- **SPRINT (PROPOSED – FINAL CONFIGURATION):**
  Antennas: Two (2) RFS APXVSPP18-C-A20 panel antennas, one (1) Powerwave P40-16-XLPP-RR-A panel antenna, three (3) 1900MHz 4X45W RRH's and three (3) 800MHz 2X50W RRH's mounted on three (3) existing 10-ft boom gates with a RAD center elevation of ±91-ft above grade level.
  Coax Cables: Three (3) 1-1/4"∅ Hybriflex cables running on the face of the existing tower as specified in Section 3 of this report.

Note 1: All existing equipment shall be removed upon the successful completion of the testing of the proposed equipment. The removal the equipment shall be completed within a time frame acceptable to CL&P.

CENTEK Engineering, Inc.
Structural Analysis - 180-ft ROHN SSV Lattice Tower
Sprint Antenna Upgrade – CT03XC383
Newtown, CT
March 28, 2013

Primary Assumptions Used in the Analysis

- The tower structure's theoretical capacity not including any assessment of the condition of the tower.
- The tower carries the horizontal and vertical loads due to the weight of antennas, ice load and wind.
- Tower is properly installed and maintained.
- Tower is in plumb condition.
- Tower loading for antennas and mounts as listed in this report.
- All bolts are appropriately tightened providing the necessary connection continuity.
- All welds are fabricated with ER-70S-6 electrodes.
- All members are assumed to be as specified in the original tower design documents.
- All members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards.
- All member protective coatings are in good condition.
- All tower members were properly designed, detailed, fabricated, installed and have been properly maintained since erection.
- Any deviation from the analyzed antenna loading will require a new analysis for verification of structural adequacy.
- **All coax cables routed as specified in Section 3 of this report.**

CENTEK Engineering, Inc.
Structural Analysis - 180-ft ROHN SSV Lattice Tower
Sprint Antenna Upgrade – CT03XC383
Newtown, CT
March 28, 2013

Analysis

The existing tower was analyzed using a comprehensive computer program entitled tnxTower. The program analyzes the tower, considering the worst case loading condition. The tower is considered as loaded by concentric forces along the tower legs, and the model assumes that the leg members are subjected to bending, axial, and shear forces.

The existing tower was analyzed for 85mph basic wind speed (fastest mile) with no ice and 85mph with ½ inch accumulative ice to determine stresses in members as per guidelines of Northeast Utilities Substation Standard (NU SUB-090), TIA/EIA-222-F-96 entitled "Structural Standards for Steel Antenna Towers and Antenna Supporting Structures", the American Institute of Steel Construction (AISC) and the Manual of Steel Construction; Allowable Stress Design (ASD). **The controlling antenna configuration was determined to be the interim configuration. All calculations were performed using this configuration.**

Tower Loading

Tower loading was determined by the basic wind speed as applied to projected surface areas with modification factors per TIA/EIA-222-F, gravity loads of the tower structure and its components, and the application of ½" radial ice tower structure and its components.

Basic Wind Speed:	Fairfield; v = 85 mph (fastest mile)	*[Section 16 of TIA/EIA-222-F-96]*
	NU SUB-090; v = 85 mph (fastest mile)	*[Northeast Utilities Substation Standard 090]*
	Newtown; v = 95 mph (3 second gust) equivalent to v = 77.5 mph (fastest mile)	*[Appendix K of the 2005 CT Building Code Supplement]*
	NU–SUB-090 wind speed controls	
Load Cases:	Load Case 1; 85 mph wind speed w/ no ice plus gravity load – used in calculation of tower stresses and rotation. This load case typically controls the design.	*[Northeast Utilities Substation Standard 090]*
	Load Case 2; 85 mph wind speed w/ ½" radial ice plus gravity load – used in calculation of tower stresses. This load case typically controls the design of lattice towers.	*[Northeast Utilities Substation Standard 090]*
	Load Case 3; Seismic – not checked	*[Section 1614.5 of State Bldg. Code 2005] does not control in the design of this structure type*

CENTEK Engineering, Inc.
Structural Analysis - 180-ft ROHN SSV Lattice Tower
Sprint Antenna Upgrade – CT03XC383
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Tower Capacity

Tower stresses were calculated utilizing the structural analysis software tnxTower. Allowable stresses were determined based on Table 5 of the TIA/EIA code with a 1/3 increase per Section 3.1.1.1 of the same code.

The tower deflection was evaluated with a wind velocity of 85 mph concurrent with 0.5" ice to determine twist (rotation) and sway (deflection) in accordance with NU SUB-90 requirements.

- Calculated stresses were found to be within allowable limits. In Load Case 2, per tnxTower "Section Capacity Table", this tower was found to be at **93.1%** of its total capacity.

Tower Section	Elevation	Stress Ratio (percentage of capacity)	Result
Leg (T7)	43'-0"- 63'-0"	93.1%	PASS
Diagonal (T9)	23'-0"- 33'-0"	60.6%	PASS (2)
Diagonal (T9) (Bolt Shear)	23'-0"- 33'-0"	75.5%	PASS (2)
Diagonal (T7) (Bolt Shear)	43'-0"- 63'-0"	89.9%	PASS
Diagonal (T6)	63'-0"- 83'-0"	92.6%	PASS
Diagonal (T4) (Bolt Shear)	103'-0"- 123'-0"	70.1%	PASS (2)

Note 2: Tower member and component stresses indicated as such are reflective of reinforcements included within structural reinforcement and modification design documents prepared by Centek Engineering, Inc., for AT&T; Centek Job No. 11009.CO6.

The tower deflection (sway) was found to be within allowable limits as prescribed by Northeast Utilities. The tower deflection (sway) is 0.5171 degrees.

Deflection Criteria	Proposed (degrees)	Allowable (degrees)	Result
Sway (Tilt)	0.5171	0.5	n/a
Twist	0.0329	0.5	n/a
Combined	0.5181	0.5	PASS (3)

Note 3: Under the proposed Load Case 2 above the tower marginally exceeds NU-SUB-90 limitation of 0.5 degrees. Tower deflection is subject to NEU approval.

CENTEK Engineering, Inc.
Structural Analysis - 180-ft ROHN SSV Lattice Tower
Sprint Antenna Upgrade – CT03XC383
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Foundation and Anchors

The existing foundation system consists of three (3) 2-ft 6in square reinforced concrete piers on three (3) 10-ft square x 2-ft deep reinforced concrete pads concentrically bearing on the existing sub grade, with subsequent mass concrete reinforcement located at grade. The existing foundation geometry was obtained from the aforementioned foundation reinforcement design documents prepared by Centek for AT&T. The sub-grade conditions used in the analysis of the existing foundation were obtained from a geo-technical soil study prepared by Clarence Welti and Assoc., dated October 19, 2011. The tower legs are connected to the foundation with (6) 1.00"Ø, ASTM A-449 (Fu = 120ksi) anchor bolts per leg.

Review of the foundation and anchor design consisted of verification of applied loads obtained from the tower design calculations and code checks of allowable stresses:

- The tower reactions developed from the governing Load Case 2 were used in the verification of the foundation and anchor bolts:

Load Effect	Proposed Tower Reactions
Leg Shear	31 kips
Leg Compression	246 kips
Leg Tension	187 kips
Base Moment	4871 ft-kips
Base Shear	55 kips

- The anchor bolts were found to be within allowable limits.

Tower Section	Component	Stress Ratio (percentage of capacity)	Result
Anchor Bolts	Tension	71.9%	PASS

- The foundation was found to be within allowable limits.

Foundation	Design Limit	IBC 2003/2005 CT State Building Code Section 3108.4.2 (FS)[4]	Proposed Loading (FS)[4]	Result
(Existing Conditions)	Overturning	2.00	2.68	PASS

Note 4: FS denotes Factor of Safety

CENTEK Engineering, Inc.
Structural Analysis - 180-ft ROHN SSV Lattice Tower
Sprint Antenna Upgrade – CT03XC383
Newtown, CT
March 28, 2013

Conclusion

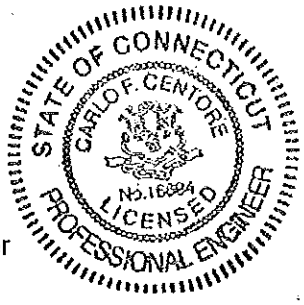
This analysis shows that the subject tower **is adequate** to support the proposed antenna upgrade configuration.

The analysis is based, in part, on the information provided to this office by Northeast Utilities and Sprint. If the existing conditions are different than the information in this report, Centek Engineering, Inc. must be contacted for resolution of any Respectfully Submitted by:

Please feel free to call with any questions or comments.

Respectfully Submitted by:

Carlo F. Centore, PE
Principal ~ Structural Engineer



Prepared by:

Jason R. Mead
Structural Engineer

CENTEK Engineering, Inc.
Structural Analysis - 180-ft ROHN SSV Lattice Tower
Sprint Antenna Upgrade – CT03XC383
Newtown, CT
March 28, 2013

Standard Conditions for Furnishing of Professional Engineering Services on Existing Structures

All engineering services are performed on the basis that the information used is current and correct. This information may consist of, but is not necessarily limited to:

- Information supplied by the client regarding the structure itself, its foundations, the soil conditions, the antenna and feed line loading on the structure and its components, or other relevant information.
- Information from the field and/or drawings in the possession of Centek Engineering, Inc. or generated by field inspections or measurements of the structure.
- It is the responsibility of the client to ensure that the information provided to Centek Engineering, Inc. and used in the performance of our engineering services is correct and complete. In the absence of information to the contrary, we assume that all structures were constructed in accordance with the drawings and specifications and are in an un-corroded condition and have not deteriorated. It is therefore assumed that its capacity has not significantly changed from the "as new" condition.
- All services will be performed to the codes specified by the client, and we do not imply to meet any other codes or requirements unless explicitly agreed in writing. If wind and ice loads or other relevant parameters are to be different from the minimum values recommended by the codes, the client shall specify the exact requirement. In the absence of information to the contrary, all work will be performed in accordance with the latest revision of ANSI/ASCE10 & ANSI/EIA-222
- All services performed, results obtained, and recommendations made are in accordance with generally accepted engineering principles and practices. Centek Engineering, Inc. is not responsible for the conclusions, opinions and recommendations made by others based on the information we supply.

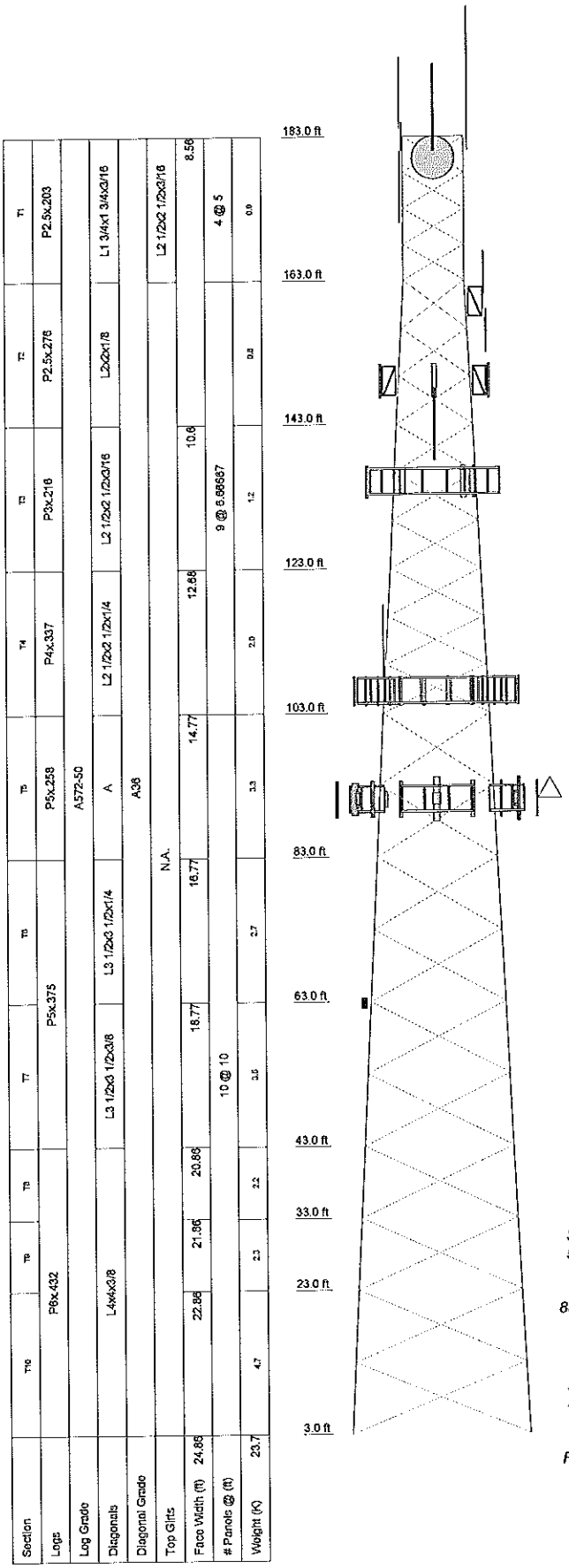
CENTEK Engineering, Inc.
Structural Analysis - 180-ft ROHN SSV Lattice Tower
Sprint Antenna Upgrade – CT03XC383
Newtown, CT
March 28, 2013

GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM

tnxTower, is an integrated structural analysis and design software package for Designed specifically for the telecommunications industry, tnxTower, formerly RISA Tower, automates much of the tower analysis and design required by the TIA/EIA 222 Standard.

tnxTower Features:

- tnxTower can analyze and design 3- and 4-sided guyed towers, 3- and 4-sided self-supporting towers and either round or tapered ground mounted poles with or without guys.
- The program analyzes towers using the TIA-222-G (2005) standard or any of the previous TIA/EIA standards back to RS-222 (1959). Steel design is checked using the AISC ASD 9th Edition or the AISC LRFD specifications.
- Linear and non-linear (P-delta) analyses can be used in determining displacements and forces in the structure. Wind pressures and forces are automatically calculated.
- Extensive graphics plots include material take-off, shear-moment, leg compression, displacement, twist, feed line, guy anchor and stress plots.
- tnxTower contains unique features such as True Cable behavior, hog rod take-up, foundation stiffness and much more.



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
PD220 (NU)	191	10'6" Site Pro T-Arm (ATT)	135
2' Dia 8' Omni (NU)	189	10'6" Site Pro T-Arm (ATT)	135
10' 2-Bay Dipole (NU)	188	800 10121 (ATT)	135
3'x2.5" Pipe Mount (NU)	183	800 10121 (ATT)	135
4'x4" Pipe Mount (NU)	183	(2) LPG21401 TMA (ATT)	135
6'x4" Pipe Mount (NU Dish)	180	(2) LPG21401 TMA (ATT)	135
6 FT DISH (NU)	180	12' Dipole (NU)	113
12' Dipole (NU)	176	(4) DB844H90E-XY w/Mount Pipe (Sprint Nextel)	106
DB586-Y (NEU)	164		
3' Standoff (NEU)	160	12' Frame (Sprint Nextel)	106
TMA (NEU)	160	12' Frame (Sprint Nextel)	106
DB586-Y (NEU)	156	(4) DB844H90E-XY w/Mount Pipe (Sprint Nextel)	106
(2) TMA 10"x8"x3" (T-Mobile)	149	12' Frame (Sprint Nextel)	106
3' Standoff (T-Mobile)	149	(4) DB844H90E-XY w/Mount Pipe (Sprint Nextel)	106
RR90-17-00DP w/Mount Pipe (T-Mobile)	149	(2) DB950G65E-M w/Mount Pipe (Sprint)	91
(2) TMA 10"x8"x3" (T-Mobile)	149	10' Frame (Sprint)	91
3' Standoff (T-Mobile)	149	(2) DB930F90E-M w/Mount Pipe (Sprint)	91
RR90-17-00DP w/Mount Pipe (T-Mobile)	149	10' Frame (Sprint)	91
(2) TMA 10"x8"x3" (T-Mobile)	149	(2) DB930F90E-M w/Mount Pipe (Sprint)	91
RR90-17-00DP w/Mount Pipe (T-Mobile)	149	APXVSPP18-C-A20 w/ Mount (Sprint)	91
3' Standoff (T-Mobile)	149	APXVSPP18-C-A20 w/ Mount (Sprint)	91
10' 2-Bay Dipole (NU)	148 - 138	P40-16-XLPP-RR-A w/ Mount (Sprint)	91
3' Standoff (NU)	138	FD-RRH 4x40 1900 (Sprint)	91
800 10121 (ATT)	135	FD-RRH 4x40 1900 (Sprint)	91
(2) LPG21401 TMA (ATT)	135	FD-RRH 4x40 1900 (Sprint)	91
P65-16-XL w/ mount pipe (ATT)	135	FD-RRH 2x50 800 (Sprint)	91
P65-16-XL w/ mount pipe (ATT)	135	FD-RRH 2x50 800 (Sprint)	91
P65-16-XL w/ mount pipe (ATT)	135	FD-RRH 2x50 800 (Sprint)	91
(2) RRH (ATT)	135	10' Frame (Sprint)	91
(2) RRH (ATT)	135	GPS (Sprint)	62
(2) RRH (ATT)	135	1' Standoff (Sprint)	62
DC6-48-60-18-8F Surge Arrestor (ATT)	135		
10'6" Site Pro T-Arm (ATT)	135		

SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	L3X3X3/16 Reinf w/L2.5X2.5X3/16		

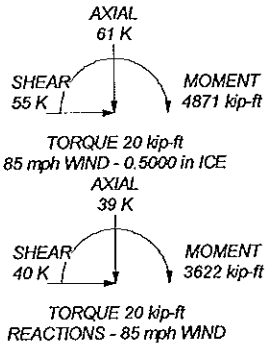
MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-50	50 ksi	65 ksi	A36	36 ksi	58 ksi

TOWER DESIGN NOTES

1. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
2. Tower is also designed for a 85 mph basic wind with 0.50 in ice.
3. Deflections are based upon a 85 mph wind.
4. Analysis per NU-SUB-090 Standard
5. TOWER RATING: 93.1%

MAX. CORNER REACTIONS AT BASE:
DOWN: 246 K
UPLIFT: -187 K
SHEAR: 31 K



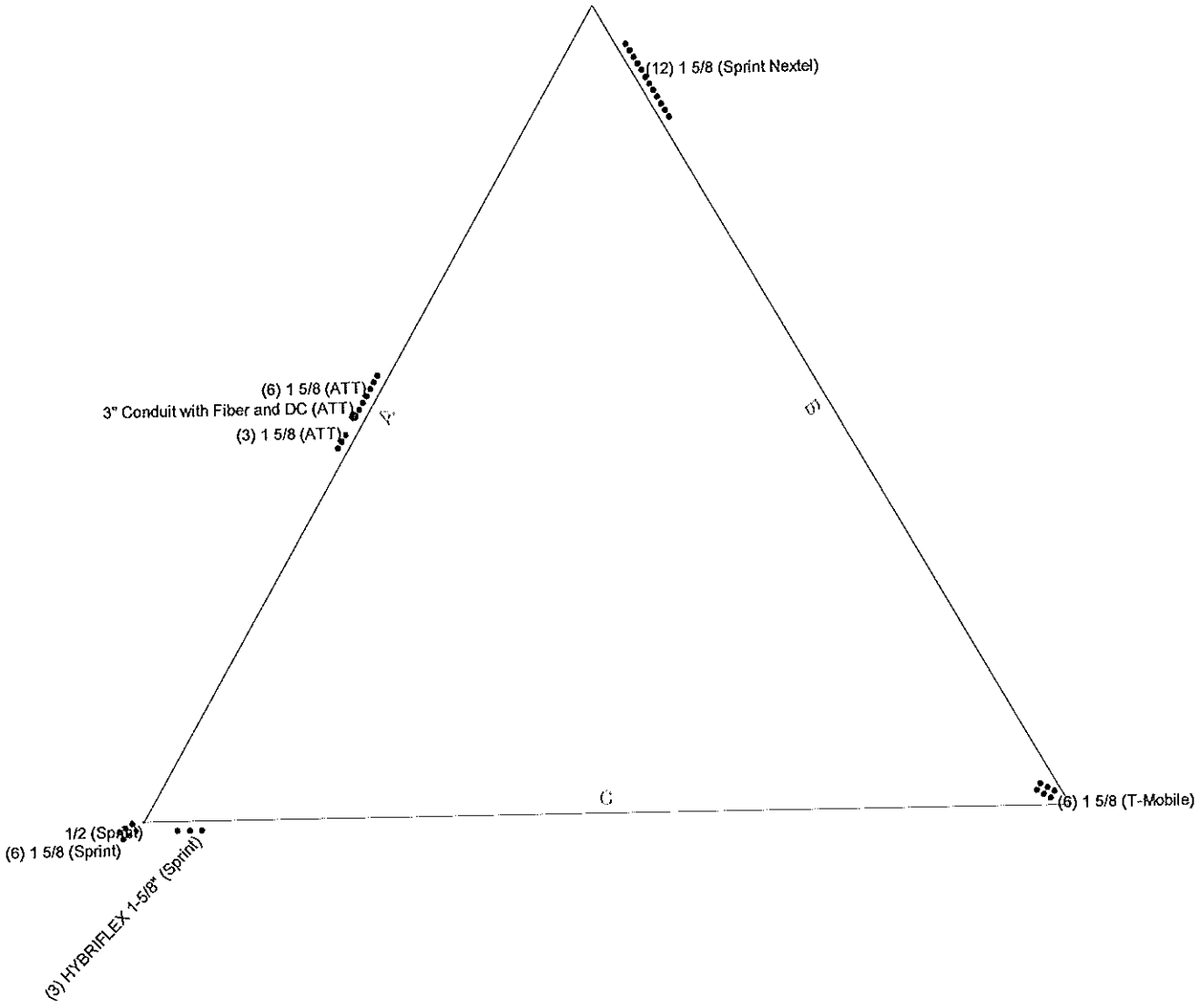
Centek Engineering Inc.
63-2 N. Branford Road
Branford, CT 06405
Phone: (203) 488-0580
FAX: (203) 488-8587

Job: *12047.CO6 ~ 180-ft Rohn SSV Lattice Tower*			
Project: *20 Barnabas Rd, Newtown, CT*			
Client: SPRINT	Drawn by: jrm	App'd:	
Code: TIA/EIA-222-F	Date: 03/28/13	Scale: NTS	
Path:		Dwg No. E-1	

Feedline Plan

NV_CT03XC383

_____ Round _____ Flat _____ App In Face _____ App Out Face



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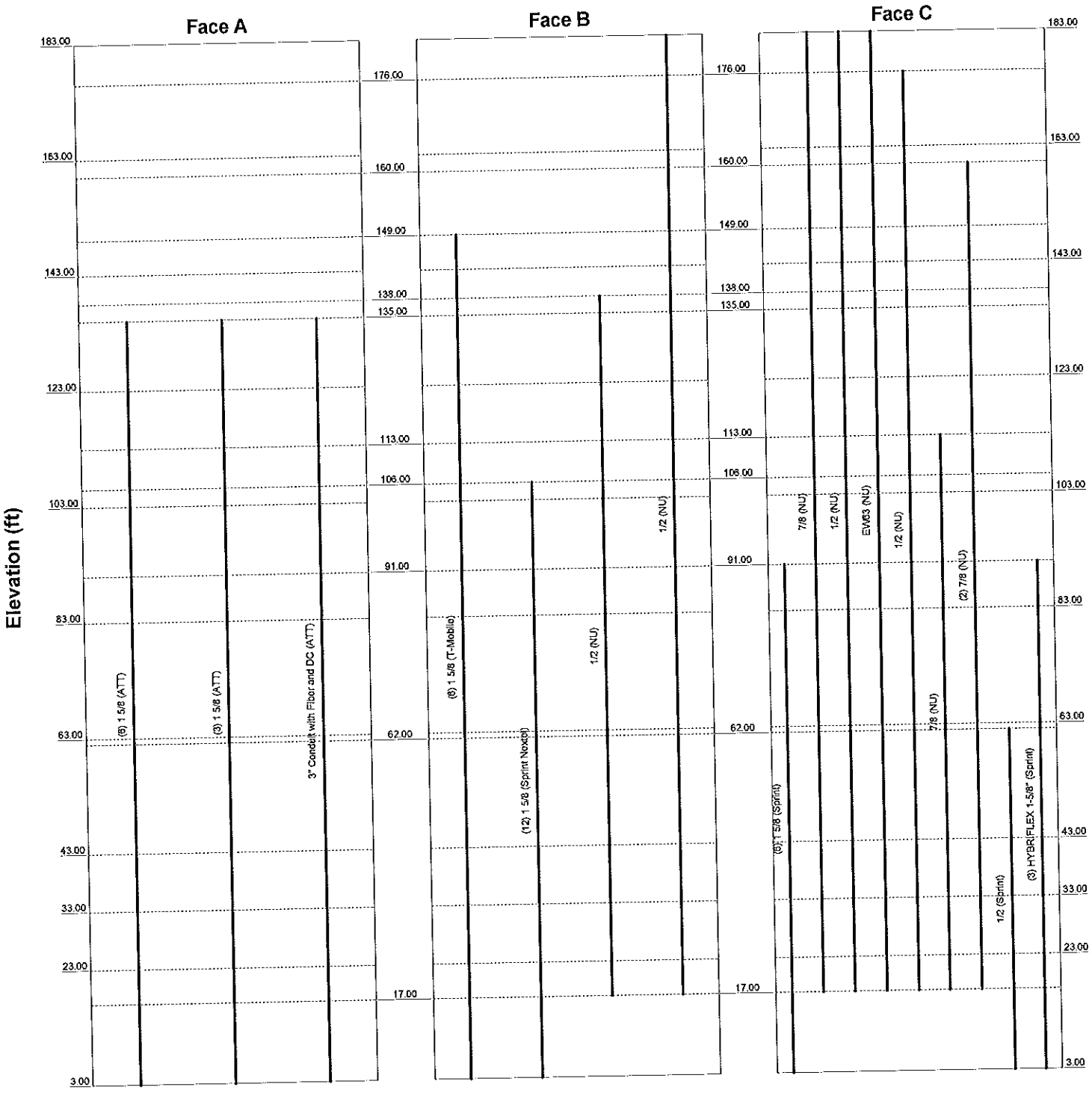
Code: TIA/EIA-222-F	Date: 03/28/13	Scale: NTS	
Path:		Dwg No. E-7	

Feedline Distribution Chart
3' - 183'

NV_CT03XC383

Round Flat App In Face App Out Face Truss Leg



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Path:		Dwg No. E-7	

tnxTower	Job: 12047.CO6 ~ 180-ft Rohn SSV Lattice Tower	Page: 1 of 33
Centek Engineering Inc. 63-2 N. Branford Road Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Project: 20 Barnabas Rd, Newtown, CT	Date: 08:52:11 03/28/13
	Client: SPRINT	Designed by: jrm

Tower Input Data

The main tower is a 3x free standing tower with an overall height of 183.00 ft above the ground line.
The base of the tower is set at an elevation of 3.00 ft above the ground line.
The face width of the tower is 8.56 ft at the top and 24.86 ft at the base.
This tower is designed using the TIA/EIA-222-F standard.
The following design criteria apply:

Basic wind speed of 85 mph.
Nominal ice thickness of 0.5000 in.
Ice density of 56 pcf.
A wind speed of 85 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 85 mph.
Analysis per NU-SUB-090 Standard.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in tower member design is 1.333.
Local bending stresses due to climbing loads, feedline supports, and appurtenance mounts are not considered.

Options

Consider Moments - Legs	Distribute Leg Loads As Uniform	Treat Feedline Bundles As Cylinder
Consider Moments - Horizontals	Assume Legs Pinned	Use ASCE 10 X-Brace Ly Rules
Consider Moments - Diagonals	√ Assume Rigid Index Plate	√ Calculate Redundant Bracing Forces
Use Moment Magnification	√ Use Clear Spans For Wind Area	Ignore Redundant Members in FEA
√ Use Code Stress Ratios	√ Use Clear Spans For KL/r	SR Leg Bolts Resist Compression
√ Use Code Safety Factors - Guys	√ Retension Guys To Initial Tension	√ All Leg Panels Have Same Allowable
Escalate Ice	Bypass Mast Stability Checks	Offset Girt At Foundation
Always Use Max Kz	√ Use Azimuth Dish Coefficients	√ Consider Feedline Torque
Use Special Wind Profile	√ Project Wind Area of Appurt.	Include Angle Block Shear Check
√ Include Bolts In Member Capacity	√ Autocalc Torque Arm Areas	Poles
Leg Bolts Are At Top Of Section	SR Members Have Cut Ends	Include Shear-Torsion Interaction
Secondary Horizontal Braces Leg	√ Sort Capacity Reports By Component	Always Use Sub-Critical Flow
Use Diamond Inner Bracing (4 Sided)	Triangulate Diamond Inner Bracing	Use Top Mounted Sockets
Add IBC .6D+W Combination		

tnxTower	Job: 12047.CO6 ~ 180-ft Rohn SSV Lattice Tower	Page: 2 of 33
Centek Engineering Inc. 63-2 N. Branford Road Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Project: 20 Barnabas Rd, Newtown, CT	Date: 08:52:11 03/28/13
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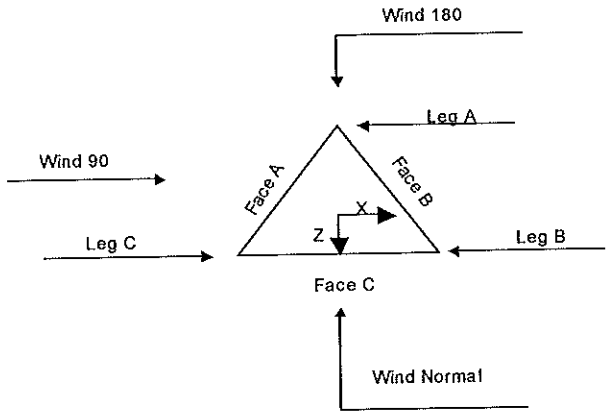

Triangular Tower

Tower Section Geometry

Tower Section	Tower Elevation	Assembly Database	Description	Section Width	Number of Sections	Section Length
	ft			ft		ft
T1	183.00-163.00			8.56	1	20.00
T2	163.00-143.00			8.56	1	20.00
T3	143.00-123.00			10.60	1	20.00
T4	123.00-103.00			12.68	1	20.00
T5	103.00-83.00			14.77	1	20.00
T6	83.00-63.00			16.77	1	20.00
T7	63.00-43.00			18.77	1	20.00
T8	43.00-33.00			20.86	1	10.00
T9	33.00-23.00			21.86	1	10.00
T10	23.00-3.00			22.86	1	20.00

Tower Section Geometry *(cont'd)*

Tower Section	Tower Elevation	Diagonal Spacing	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset	Bottom Girt Offset
	ft	ft				in	in
T1	183.00-163.00	5.00	X Brace	No	No	0.0000	0.0000
T2	163.00-143.00	6.67	X Brace	No	No	0.0000	0.0000
T3	143.00-123.00	6.67	X Brace	No	No	0.0000	0.0000
T4	123.00-103.00	6.67	X Brace	No	No	0.0000	0.0000
T5	103.00-83.00	10.00	X Brace	No	No	0.0000	0.0000

tnxTower	Job: 12047.CO6 ~ 180-ft Rohn SSV Lattice Tower	Page: 3 of 33
Centek Engineering Inc. 63-2 N. Branford Road Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Project: 20 Barnabas Rd, Newtown, CT	Date: 08:52:11 03/28/13
	Client: SPRINT	Designed by: jrm

Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T6	83.00-63.00	10.00	X Brace	No	No	0.0000	0.0000
T7	63.00-43.00	10.00	X Brace	No	No	0.0000	0.0000
T8	43.00-33.00	10.00	X Brace	No	No	0.0000	0.0000
T9	33.00-23.00	10.00	X Brace	No	No	0.0000	0.0000
T10	23.00-3.00	10.00	X Brace	No	No	0.0000	0.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 183.00-163.00	Pipe	P2.5x.203	A572-50 (50 ksi)	Equal Angle	L1 3/4x1 3/4x3/16	A36 (36 ksi)
T2 163.00-143.00	Pipe	P2.5x.276	A572-50 (50 ksi)	Equal Angle	L2x2x1/8	A36 (36 ksi)
T3 143.00-123.00	Pipe	P3x.216	A572-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T4 123.00-103.00	Pipe	P4x.337	A572-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x1/4	A36 (36 ksi)
T5 103.00-83.00	Pipe	P5x.258	A572-50 (50 ksi)	Arbitrary Shape	L3X3X3/16 Reinf w/L2.5X2.5X3/16	A36 (36 ksi)
T6 83.00-63.00	Pipe	P5x.375	A572-50 (50 ksi)	Equal Angle	L3 1/2x3 1/2x1/4	A36 (36 ksi)
T7 63.00-43.00	Pipe	P5x.375	A572-50 (50 ksi)	Equal Angle	L3 1/2x3 1/2x3/8	A36 (36 ksi)
T8 43.00-33.00	Pipe	P6x.432	A572-50 (50 ksi)	Equal Angle	L4x4x3/8	A36 (36 ksi)
T9 33.00-23.00	Pipe	P6x.432	A572-50 (50 ksi)	Equal Angle	L4x4x3/8	A36 (36 ksi)
T10 23.00-3.00	Pipe	P6x.432	A572-50 (50 ksi)	Equal Angle	L4x4x3/8	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T1 183.00-163.00	Equal Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)	Equal Angle		A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Gusset Area (per face) ft²	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in

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	Client: SPRINT	Designed by: jrm

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals	Double Angle Stitch Bolt Spacing Horizontals
ft	ft^2	in					in	in
T1 183.00-163.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T2 163.00-143.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T3 143.00-123.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T4 123.00-103.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T5 103.00-83.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T6 83.00-63.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T7 63.00-43.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T8 43.00-33.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T9 33.00-23.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T10 23.00-3.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000

Tower Section Geometry *(cont'd)*

Tower Elevation	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X	X Brace Diags Y	K Brace Diags X	K Brace Diags Y	Single Diags X	Single Diags Y	Girts X	Girts Y	Horiz. X	Horiz. Y	Sec. Horiz. X	Sec. Horiz. Y	Inner Brace X	Inner Brace Y
ft																	
T1 183.00-163.00	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
T2 163.00-143.00	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
T3 143.00-123.00	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
T4 123.00-103.00	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
T5 103.00-83.00	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
T6 83.00-63.00	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
T7 63.00-43.00	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
T8 43.00-33.00	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
T9 33.00-23.00	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
T10 23.00-3.00	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

[1]*Note: K factors are applied to member segment lengths. K-braces without inner supporting members will have the K factor in the out-of-plane direction applied to the overall length.*

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Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
T1 183.00-163.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T2 163.00-143.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T3 143.00-123.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T4 123.00-103.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T5 103.00-83.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T6 83.00-63.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T7 63.00-43.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T8 43.00-33.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T9 33.00-23.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T10 23.00-3.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
T1 183.00-163.00	Flange	0.6250 A325N	4	0.5000 A325N	1	0.5000 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T2 163.00-143.00	Flange	0.7500 A325N	4	0.5000 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T3 143.00-123.00	Flange	0.8750 A325N	4	0.5000 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T4 123.00-103.00	Flange	1.0000 A325N	4	0.5000 A325X	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T5 103.00-83.00	Flange	1.0000 A325N	4	0.7500 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T6 83.00-63.00	Flange	1.0000 A325N	4	0.7500 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T7 63.00-43.00	Flange	1.0000 A325N	6	0.7500 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T8 43.00-33.00	Flange	0.0000 A325N	0	0.7500 A325X	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T9 33.00-23.00	Flange	1.0000 A325N	6	0.8750 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T10 23.00-3.00	Flange	1.0000 A449	6	0.8750 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0

Feed Line/Linear Appurtenances - Entered As Round Or Flat

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Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
1 5/8 (Sprint)	C	No	Ar (Leg)	91.00 - 3.00	0.0000	-0.02	6	3	0.5000	1.9800		1.04
1 5/8 (T-Mobile)	B	No	Ar (Leg)	149.00 - 3.00	0.0000	0.03	6	3	0.5000	1.9800		1.04
1 5/8 (ATT)	A	Yes	Ar (CfAe)	135.00 - 3.00	2.0000	0.02	6	6	0.5000	1.9800		1.04
1 5/8 (ATT)	A	Yes	Ar (CfAe)	135.00 - 3.00	2.0000	-0.04	3	3	0.5000	1.9800		1.04
1 5/8 (Sprint Nextel)	B	Yes	Ar (CfAe)	106.00 - 3.00	2.0000	-0.4	12	12	0.5000	1.9800		1.04
1/2 (NU)	B	Yes	Ar (CfAe)	138.00 - 17.00	2.0000	-0.47	1	1	0.5800	0.5800		0.25
1/2 (NU)	B	Yes	Ar (CfAe)	183.00 - 17.00	2.0000	-0.46	1	1	0.5800	0.5800		0.25
7/8 (NU)	C	Yes	Ar (CfAe)	183.00 - 17.00	2.0000	-0.45	1	1	1.1100	1.1100		0.54
1/2 (NU)	C	Yes	Ar (CfAe)	183.00 - 17.00	2.0000	-0.44	1	1	0.5800	0.5800		0.25
EW63 (NU)	C	Yes	Af (CfAe)	183.00 - 17.00	2.0000	-0.43	1	1	1.5742	1.5742	5.0668	0.51
1/2 (NU)	C	Yes	Ar (CfAe)	176.00 - 17.00	2.0000	-0.42	1	1	0.5800	0.5800		0.25
7/8 (NU)	C	Yes	Ar (CfAe)	113.00 - 17.00	2.0000	-0.41	1	1	1.1100	1.1100		0.54
7/8 (NU)	C	Yes	Ar (CfAe)	160.00 - 17.00	2.0000	-0.4	2	2	1.1100	1.1100		0.54
1/2 (Sprint)	C	No	Ar (Leg)	62.00 - 3.00	0.0000	0	1	1	0.5800	0.5800		0.25
3" Conduit with Fiber and DC (ATT)	A	Yes	Ar (CfAe)	135.00 - 3.00	2.0000	-0.01	1	1	0.0000	3.0000		1.16
HYBRIFLEX 1-5/8" (Sprint)	C	Yes	Ar (CfAe)	91.00 - 3.00	2.0000	0.45	3	3	1.9800	1.9800		1.90

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft²	A_F ft²	C_AA_A In Face ft²	C_AA_A Out Face ft²	Weight K
T1	183.00-163.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.967	0.000	0.000	0.000	0.01
		C	3.445	2.624	0.000	0.000	0.03
T2	163.00-143.00	A	0.000	0.000	0.000	0.000	0.00
		B	3.937	0.000	0.000	0.000	0.04
		C	9.898	2.624	0.000	0.000	0.05
T3	143.00-123.00	A	20.820	0.000	0.000	0.000	0.13
		B	11.592	0.000	0.000	0.000	0.13
		C	17.383	2.624	0.000	0.000	0.05
T4	123.00-103.00	A	34.700	0.000	0.000	0.000	0.21
		B	17.773	0.000	0.000	0.000	0.17
		C	18.308	2.624	0.000	0.000	0.06
T5	103.00-83.00	A	38.660	0.000	0.000	0.000	0.21
		B	51.433	0.000	0.000	0.000	0.38
		C	27.153	2.624	0.000	0.000	0.16
T6	83.00-63.00	A	44.600	0.000	0.000	0.000	0.21

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Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		B	51.433	0.000	0.000	0.000	0.38
		C	39.033	2.624	0.000	0.000	0.30
T7	63.00-43.00	A	45.518	0.000	0.000	0.000	0.21
		B	51.433	0.000	0.000	0.000	0.38
		C	39.952	2.624	0.000	0.000	0.31
T8	43.00-33.00	A	22.783	0.000	0.000	0.000	0.11
		B	25.717	0.000	0.000	0.000	0.19
		C	20.000	1.312	0.000	0.000	0.15
T9	33.00-23.00	A	22.783	0.000	0.000	0.000	0.11
		B	25.717	0.000	0.000	0.000	0.19
		C	20.000	1.312	0.000	0.000	0.15
T10	23.00-3.00	A	45.567	0.000	0.000	0.000	0.21
		B	50.080	0.000	0.000	0.000	0.38
		C	33.467	0.787	0.000	0.000	0.26

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
T1	183.00-163.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		2.633	0.000	0.000	0.000	0.02
		C		7.862	3.735	0.000	0.000	0.10
T2	163.00-143.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		4.123	2.480	0.000	0.000	0.11
		C		16.252	6.215	0.000	0.000	0.16
T3	143.00-123.00	A	0.500	9.960	17.360	0.000	0.000	0.33
		B		9.575	8.267	0.000	0.000	0.34
		C		20.783	12.001	0.000	0.000	0.17
T4	123.00-103.00	A	0.500	16.600	28.933	0.000	0.000	0.55
		B		10.978	15.087	0.000	0.000	0.44
		C		22.542	12.001	0.000	0.000	0.18
T5	103.00-83.00	A	0.500	18.587	32.240	0.000	0.000	0.55
		B		15.200	53.733	0.000	0.000	0.99
		C		32.247	15.308	0.000	0.000	0.40
T6	83.00-63.00	A	0.500	21.567	37.200	0.000	0.000	0.55
		B		15.200	53.733	0.000	0.000	0.99
		C		44.167	20.268	0.000	0.000	0.70
T7	63.00-43.00	A	0.500	24.068	37.200	0.000	0.000	0.55
		B		15.200	53.733	0.000	0.000	0.99
		C		46.668	20.268	0.000	0.000	0.72
T8	43.00-33.00	A	0.500	12.100	18.600	0.000	0.000	0.27
		B		7.600	26.867	0.000	0.000	0.49
		C		23.400	10.134	0.000	0.000	0.36
T9	33.00-23.00	A	0.500	12.100	18.600	0.000	0.000	0.27
		B		7.600	26.867	0.000	0.000	0.49
		C		23.400	10.134	0.000	0.000	0.36
T10	23.00-3.00	A	0.500	24.200	37.200	0.000	0.000	0.55
		B		11.513	53.733	0.000	0.000	0.96
		C		33.267	17.654	0.000	0.000	0.59

Feed Line Shielding

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	Client: SPRINT	Designed by: jrm

Section	Elevation	Face	A_R	A_R Ice	A_F	A_F Ice
	ft		ft^2	ft^2	ft^2	ft^2
T1	183.00-163.00	A	0.000	0.000	0.000	0.000
		B	0.000	0.113	0.075	0.205
		C	0.000	0.520	0.473	0.948
T2	163.00-143.00	A	0.000	0.000	0.000	0.000
		B	0.000	0.080	0.059	0.161
		C	0.000	0.581	0.583	1.162
T3	143.00-123.00	A	0.000	0.788	1.501	1.969
		B	0.000	0.133	0.122	0.332
		C	0.000	0.580	0.729	1.449
T4	123.00-103.00	A	0.000	1.266	2.412	3.165
		B	0.000	0.357	0.547	0.892
		C	0.000	0.608	0.767	1.520
T5	103.00-83.00	A	0.000	0.000	2.270	3.577
		B	0.000	0.000	2.716	4.376
		C	0.000	0.000	1.041	2.324
T6	83.00-63.00	A	0.000	0.871	2.323	3.049
		B	0.000	1.065	2.781	3.729
		C	0.000	0.737	1.463	2.579
T7	63.00-43.00	A	0.000	0.850	2.268	2.976
		B	0.000	1.040	2.714	3.640
		C	0.000	0.719	1.428	2.518
T8	43.00-33.00	A	0.000	0.419	1.277	1.676
		B	0.000	0.513	1.529	2.050
		C	0.000	0.354	0.804	1.418
T9	33.00-23.00	A	0.000	0.416	1.267	1.663
		B	0.000	0.508	1.517	2.034
		C	0.000	0.352	0.798	1.407
T10	23.00-3.00	A	0.000	0.823	2.508	3.292
		B	0.000	0.940	2.905	3.760
		C	0.000	0.397	0.975	1.589

Feed Line Center of Pressure

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
T1	183.00-163.00	3.4327	1.7386	4.1619	1.7337
T2	163.00-143.00	7.8347	4.6236	8.3341	4.5416
T3	143.00-123.00	3.4587	1.6958	4.7140	1.7305
T4	123.00-103.00	0.8241	-2.9153	3.0645	-1.8318
T5	103.00-83.00	-0.5266	-13.0816	1.8193	-10.8154
T6	83.00-63.00	-5.0470	-10.3474	-2.0705	-8.1303
T7	63.00-43.00	-5.8780	-10.9404	-3.0928	-8.2467
T8	43.00-33.00	-5.7466	-10.5671	-3.1107	-8.0875
T9	33.00-23.00	-5.9491	-10.9318	-3.2251	-8.3767
T10	23.00-3.00	-9.7156	-13.4150	-8.4555	-11.1838

Discrete Tower Loads

tnxTower	Job: 12047.CO6 ~ 180-ft Rohn SSV Lattice Tower	Page: 9 of 33
Centek Engineering Inc. 63-2 N. Branford Road Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Project: 20 Barnabas Rd, Newtown, CT	Date: 08:52:11 03/28/13
	Client: SPRINT	Designed by: jrm

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
2" Dia 8' Omni (NU)	C	From Leg	0.50 0.00 0.00	0.0000	189.00	No Ice 1/2" Ice	2.00 3.03	2.00 3.03	0.01 0.02
4'x4" Pipe Mount (NU)	C	From Leg	0.25 0.00 0.00	0.0000	183.00	No Ice 1/2" Ice	1.32 1.58	1.32 1.58	0.04 0.06
12' Dipole (NU)	C	From Leg	0.50 0.00 0.00	0.0000	176.00	No Ice 1/2" Ice	3.60 4.83	3.60 4.83	0.04 0.06
10' 2-Bay Dipole (NU)	A	From Leg	0.50 0.00 0.00	0.0000	188.00	No Ice 1/2" Ice	1.07 1.71	1.07 1.71	0.01 0.02
3'x2.5" Pipe Mount (NU)	A	From Leg	0.25 0.00 0.00	0.0000	183.00	No Ice 1/2" Ice	0.60 0.79	0.60 0.79	0.02 0.03
6'x4" Pipe Mount (NU Dish)	A	From Leg	0.25 0.00 0.00	0.0000	180.00	No Ice 1/2" Ice	2.09 2.46	2.09 2.46	0.05 0.07
PD220 (NU)	B	From Leg	0.50 0.00 0.00	0.0000	191.00	No Ice 1/2" Ice	3.56 7.13	3.56 7.13	0.02 0.05
3' Standoff (NU)	A	From Leg	1.50 0.00 0.00	0.0000	138.00	No Ice 1/2" Ice	2.20 3.30	2.20 3.30	0.06 0.07
10' 2-Bay Dipole (NU)	A	From Leg	3.00 0.00 0.00	0.0000	148.00 - 138.00	No Ice 1/2" Ice	1.07 1.71	1.07 1.71	0.01 0.02
12' Dipole (NU)	C	From Leg	0.50 0.00 0.00	0.0000	113.00	No Ice 1/2" Ice	3.60 4.83	3.60 4.83	0.04 0.06
3' Standoff (T-Mobile)	C	From Leg	1.50 0.00 0.00	0.0000	149.00	No Ice 1/2" Ice	2.75 3.65	2.75 3.65	0.06 0.07
RR90-17-00DP w/Mount Pipe (T-Mobile)	A	From Leg	3.00 0.00 0.00	0.0000	149.00	No Ice 1/2" Ice	4.91 5.57	3.64 4.70	0.04 0.08
(2) TMA 10"x8"x3" (T-Mobile)	A	From Leg	2.50 0.00 0.00	0.0000	149.00	No Ice 1/2" Ice	0.00 0.00	0.29 0.38	0.02 0.02
3' Standoff (T-Mobile)	B	From Leg	1.50 0.00 0.00	0.0000	149.00	No Ice 1/2" Ice	2.75 3.65	2.75 3.65	0.06 0.07
RR90-17-00DP w/Mount Pipe (T-Mobile)	B	From Leg	3.00 0.00 0.00	0.0000	149.00	No Ice 1/2" Ice	4.91 5.57	3.64 4.70	0.04 0.08
(2) TMA 10"x8"x3" (T-Mobile)	B	From Leg	2.50 0.00 0.00	0.0000	149.00	No Ice 1/2" Ice	0.00 0.00	0.29 0.38	0.02 0.02
3' Standoff (T-Mobile)	C	From Leg	1.50 0.00 0.00	0.0000	149.00	No Ice 1/2" Ice	2.75 3.65	2.75 3.65	0.06 0.07
RR90-17-00DP w/Mount Pipe (T-Mobile)	C	From Leg	3.00 0.00 0.00	0.0000	149.00	No Ice 1/2" Ice	4.91 5.57	3.64 4.70	0.04 0.08
(2) TMA 10"x8"x3" (T-Mobile)	C	From Leg	2.50 0.00 0.00	0.0000	149.00	No Ice 1/2" Ice	0.00 0.00	0.29 0.38	0.02 0.02

tnxTower	Job: 12047.CO6 ~ 180-ft Rohn SSV Lattice Tower	Page: 10 of 33
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	Client: SPRINT	Designed by: jrm

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
800 10121 (ATT)	A	From Leg	2.00 4.00 0.00	0.0000	135.00	No Ice 1/2" Ice	5.46 5.88	3.29 3.64	0.05 0.08
(2) LPG21401 TMA (ATT)	A	From Leg	2.00 4.00 0.00	0.0000	135.00	No Ice 1/2" Ice	0.95 1.09	0.37 0.48	0.02 0.02
800 10121 (ATT)	B	From Leg	2.00 4.00 0.00	0.0000	135.00	No Ice 1/2" Ice	5.46 5.88	3.29 3.64	0.05 0.08
(2) LPG21401 TMA (ATT)	B	From Leg	2.00 4.00 0.00	0.0000	135.00	No Ice 1/2" Ice	0.95 1.09	0.37 0.48	0.02 0.02
800 10121 (ATT)	C	From Leg	2.00 4.00 0.00	0.0000	135.00	No Ice 1/2" Ice	5.46 5.88	3.29 3.64	0.05 0.08
(2) LPG21401 TMA (ATT)	C	From Leg	2.00 4.00 0.00	0.0000	135.00	No Ice 1/2" Ice	0.95 1.09	0.37 0.48	0.02 0.02
P65-16-XL w/ mount pipe (ATT)	A	From Leg	2.00 -4.00 0.00	0.0000	135.00	No Ice 1/2" Ice	8.40 8.95	5.54 6.48	0.07 0.12
P65-16-XL w/ mount pipe (ATT)	B	From Leg	2.00 -4.00 0.00	0.0000	135.00	No Ice 1/2" Ice	8.40 8.95	5.54 6.48	0.07 0.12
P65-16-XL w/ mount pipe (ATT)	C	From Leg	2.00 -4.00 0.00	0.0000	135.00	No Ice 1/2" Ice	8.40 8.95	5.54 6.48	0.07 0.12
(2) RRH (ATT)	A	From Leg	0.00 0.00 0.00	0.0000	135.00	No Ice 1/2" Ice	2.94 3.17	1.25 1.41	0.06 0.07
(2) RRH (ATT)	B	From Leg	0.00 0.00 0.00	0.0000	135.00	No Ice 1/2" Ice	2.94 3.17	1.25 1.41	0.06 0.07
(2) RRH (ATT)	C	From Leg	0.00 0.00 0.00	0.0000	135.00	No Ice 1/2" Ice	2.94 3.17	1.25 1.41	0.06 0.07
DC6-48-60-18-8F Surge Arrestor (ATT)	C	From Leg	0.00 0.00 0.00	0.0000	135.00	No Ice 1/2" Ice	2.23 2.45	2.23 2.45	0.02 0.04
10'6" Site Pro T-Arm (ATT)	A	From Leg	1.00 0.00 0.00	0.0000	135.00	No Ice 1/2" Ice	4.50 5.65	4.50 5.65	0.25 0.35
10'6" Site Pro T-Arm (ATT)	B	From Leg	1.00 0.00 0.00	0.0000	135.00	No Ice 1/2" Ice	4.50 5.65	4.50 5.65	0.25 0.35
10'6" Site Pro T-Arm (ATT)	C	From Leg	1.00 0.00 0.00	0.0000	135.00	No Ice 1/2" Ice	4.50 5.65	4.50 5.65	0.25 0.35
12' Frame (Sprint Nextel)	A	From Leg	1.00 0.00 0.00	0.0000	106.00	No Ice 1/2" Ice	20.70 29.10	11.60 17.00	1.10 1.60
(4) DB844H90E-XY w/Mount Pipe (Sprint Nextel)	A	From Leg	2.00 0.00 0.00	0.0000	106.00	No Ice 1/2" Ice	3.58 4.20	5.40 6.49	0.04 0.08
12' Frame (Sprint Nextel)	B	From Leg	1.00 0.00 0.00	0.0000	106.00	No Ice 1/2" Ice	20.70 29.10	11.60 17.00	1.10 1.60

tnxTower	Job: 12047.CO6 ~ 180-ft Rohn SSV Lattice Tower	Page: 11 of 33
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	Client: SPRINT	Designed by: jrm

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(4) DB844H90E-XY w/Mount Pipe	B	From Leg	2.00 0.00	0.0000	106.00	No Ice 1/2" Ice	3.58 4.20	5.40 6.49	0.04 0.08
(Sprint Nextel)			0.00						
12' Frame	C	From Leg	1.00	0.0000	106.00	No Ice	20.70	11.60	1.10
(Sprint Nextel)			0.00 0.00			1/2" Ice	29.10	17.00	1.60
(4) DB844H90E-XY w/Mount Pipe	C	From Leg	2.00 0.00	0.0000	106.00	No Ice 1/2" Ice	3.58 4.20	5.40 6.49	0.04 0.08
(Sprint Nextel)			0.00						
10' Frame	A	From Leg	2.00	0.0000	91.00	No Ice	17.20	12.50	1.00
(Sprint)			0.00 0.00			1/2" Ice	25.00	19.00	1.50
(2) DB980F90E-M w/Mount Pipe	A	From Leg	4.00 0.00	0.0000	91.00	No Ice 1/2" Ice	4.37 4.96	3.95 5.04	0.03 0.07
(Sprint)			0.00						
10' Frame	B	From Leg	2.00	0.0000	91.00	No Ice	17.20	12.50	1.00
(Sprint)			0.00 0.00			1/2" Ice	25.00	19.00	1.50
(2) DB980F90E-M w/Mount Pipe	B	From Leg	4.00 0.00	0.0000	91.00	No Ice 1/2" Ice	4.37 4.96	3.95 5.04	0.03 0.07
(Sprint)			0.00						
10' Frame	C	From Leg	2.00	0.0000	91.00	No Ice	17.20	12.50	1.00
(Sprint)			0.00 0.00			1/2" Ice	25.00	19.00	1.50
(2) DB950G65E-M w/Mount Pipe	C	From Leg	4.00 0.00	0.0000	91.00	No Ice 1/2" Ice	6.89 7.56	5.90 7.01	0.04 0.10
(Sprint)			0.00						
GPS	C	From Leg	1.00	0.0000	62.00	No Ice	1.00	1.00	0.01
(Sprint)			0.00 0.00			1/2" Ice	1.50	1.50	0.01
1' Standoff	C	From Leg	0.50	0.0000	62.00	No Ice	0.25	0.25	0.01
(Sprint)			0.00 0.00			1/2" Ice	0.38	0.38	0.01
3' Standoff	B	From Leg	1.50	0.0000	160.00	No Ice	2.75	2.75	0.06
(NEU)			0.00 0.00			1/2" Ice	3.65	3.65	0.07
DB586-Y	B	From Leg	3.00	0.0000	164.00	No Ice	1.01	1.01	0.01
(NEU)			0.00 0.00			1/2" Ice	1.28	1.28	0.02
DB586-Y	B	From Leg	3.00	0.0000	156.00	No Ice	1.01	1.01	0.01
(NEU)			0.00 0.00			1/2" Ice	1.28	1.28	0.02
TMA	B	From Leg	0.00	0.0000	160.00	No Ice	0.78	0.29	0.02
(NEU)			0.00 0.00			1/2" Ice	0.90	0.38	0.02
APXVSPP18-C-A20 w/ Mount	A	From Leg	4.00 0.00	0.0000	91.00	No Ice 1/2" Ice	8.96 9.66	8.08 9.14	0.12 0.20
(Sprint)			0.00						
APXVSPP18-C-A20 w/ Mount	B	From Leg	4.00 0.00	0.0000	91.00	No Ice 1/2" Ice	8.96 9.66	8.08 9.14	0.12 0.20
(Sprint)			0.00						
P40-16-XLPP-RR-A w/ Mount	C	From Leg	4.00 0.00	0.0000	91.00	No Ice 1/2" Ice	11.73 12.47	6.32 7.27	0.11 0.20
(Sprint)			0.00						
FD-RRH 4x40 1900	A	From Face	3.50	0.0000	91.00	No Ice	2.61	2.71	0.06
(Sprint)			0.00 0.00			1/2" Ice	2.84	2.95	0.08

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	Client: SPRINT	Designed by: jrm

Description	Face or Leg	Offset Type	Offsets: Horz Lateral / Vert (ft / ft / ft)	Azimuth Adjustment (°)	Placement (ft)		C_AA_A Front (ft^2)	C_AA_A Side (ft^2)	Weight (K)
FD-RRH 4x40 1900 (Sprint)	B	From Leg	3.50 0.00 0.00	0.0000	91.00	No Ice 1/2" Ice	2.61 2.84	2.71 2.95	0.06 0.08
FD-RRH 4x40 1900 (Sprint)	C	From Leg	3.50 0.00 0.00	0.0000	91.00	No Ice 1/2" Ice	2.61 2.84	2.71 2.95	0.06 0.08
FD-RRH 2x50 800 (Sprint)	A	From Leg	3.50 0.00 0.00	0.0000	91.00	No Ice 1/2" Ice	2.40 2.61	2.25 2.46	0.06 0.09
FD-RRH 2x50 800 (Sprint)	B	From Leg	3.50 0.00 0.00	0.0000	91.00	No Ice 1/2" Ice	2.40 2.61	2.25 2.46	0.06 0.09
FD-RRH 2x50 800 (Sprint)	C	From Leg	3.50 0.00 0.00	0.0000	91.00	No Ice 1/2" Ice	2.40 2.61	2.25 2.46	0.06 0.09

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral / Vert (ft)	Azimuth Adjustment (°)	3 dB Beam Width (°)	Elevation (ft)	Outside Diameter (ft)		Aperture Area (ft^2)	Weight (K)
6 FT DISH (NU)	A	Paraboloid w/Radome	From Leg	0.50 0.00 0.00	0.0000		180.00	6.00	No Ice 1/2" Ice	28.27 29.05	0.14 0.29

Tower Pressures - No Ice

$G_H = 1.121$

Section Elevation (ft)	z (ft)	K_z	q_z (psf)	A_G (ft^2)	Face	A_F (ft^2)	A_R (ft^2)	A_{Leg} (ft^2)	Leg %	C_AA_A In Face (ft^2)	C_AA_A Out Face (ft^2)
T1 183.00-163.00	173.00	1.605	30	175.992	A B C	12.975 12.900 15.126	9.583 10.550 13.028	9.583	42.48 40.87 34.04	0.000 0.000 0.000	0.000 0.000 0.000
T2 163.00-143.00	153.00	1.55	29	196.398	A B C	11.385 11.326 13.426	9.600 13.537 19.498	9.600	45.75 38.61 29.16	0.000 0.000 0.000	0.000 0.000 0.000
T3 143.00-123.00	133.00	1.489	28	238.641	A B C	14.865 16.243 18.260	32.508 23.279 29.071	11.688	24.67 29.57 24.69	0.000 0.000 0.000	0.000 0.000 0.000
T4 123.00-103.00	113.00	1.421	26	282.010	A B C	16.163 18.028 20.432	49.727 32.801 33.336	15.027	22.81 29.56 27.95	0.000 0.000 0.000	0.000 0.000 0.000

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	Client: SPRINT	Designed by: jrm

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{Leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
T5	93.00	1.345	25	324.683	A	17.779	57.234	18.574	24.76	0.000	0.000
103.00-83.00					B	17.333	70.008		21.27	0.000	0.000
					C	21.632	45.728		27.57	0.000	0.000
T6 83.00-63.00	73.00	1.255	23	364.683	A	20.849	63.174	18.574	22.11	0.000	0.000
					B	20.392	70.008		20.55	0.000	0.000
					C	24.333	57.608		22.67	0.000	0.000
T7 63.00-43.00	53.00	1.145	21	405.584	A	23.025	64.095	18.577	21.32	0.000	0.000
					B	22.578	70.010		20.06	0.000	0.000
					C	26.488	58.529		21.85	0.000	0.000
T8 43.00-33.00	38.00	1.041	19	219.128	A	14.074	33.843	11.060	23.08	0.000	0.000
					B	13.822	36.777		21.86	0.000	0.000
					C	15.858	31.060		23.57	0.000	0.000
T9 33.00-23.00	28.00	1	18	229.128	A	14.660	33.843	11.060	22.80	0.000	0.000
					B	14.411	36.777		21.61	0.000	0.000
					C	16.441	31.060		23.28	0.000	0.000
T10 23.00-3.00	13.00	1	18	488.255	A	31.191	67.687	22.120	22.37	0.000	0.000
					B	30.795	72.200		21.48	0.000	0.000
					C	33.511	55.587		24.83	0.000	0.000

Tower Pressure - With Ice

$G_H = 1.121$

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{Leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
T1	173.00	1.605	30	0.5000	177.658	A	12.975	20.034	12.917	39.13	0.000	0.000
183.00-163.00						B	12.770	22.555		36.57	0.000	0.000
						C	15.763	27.376		29.94	0.000	0.000
T2	153.00	1.55	29	0.5000	198.067	A	11.385	18.632	12.939	43.11	0.000	0.000
163.00-143.00						B	13.704	22.675		35.57	0.000	0.000
						C	16.438	34.302		25.50	0.000	0.000
T3	133.00	1.489	28	0.5000	240.310	A	31.756	30.745	15.027	24.04	0.000	0.000
143.00-123.00						B	24.300	31.015		27.17	0.000	0.000
						C	26.917	41.777		21.88	0.000	0.000
T4	113.00	1.421	26	0.5000	283.679	A	44.344	41.131	18.367	21.49	0.000	0.000
123.00-103.00						B	32.770	36.418		26.55	0.000	0.000
						C	29.057	47.731		23.92	0.000	0.000
T5 103.00-83.00	93.00	1.345	25	0.5000	326.352	A	52.746	40.500	21.913	23.50	0.000	0.000
						B	73.441	37.113		19.82	0.000	0.000
						C	37.067	54.160		24.02	0.000	0.000
T6 83.00-63.00	73.00	1.255	23	0.5000	366.352	A	57.324	49.229	21.913	20.57	0.000	0.000
						B	73.176	42.668		18.92	0.000	0.000
						C	40.861	71.964		19.42	0.000	0.000
T7 63.00-43.00	53.00	1.145	21	0.5000	407.253	A	59.517	52.361	21.916	19.59	0.000	0.000
						B	75.386	43.303		18.47	0.000	0.000
						C	43.043	75.092		18.55	0.000	0.000
T8 43.00-33.00	38.00	1.041	19	0.5000	219.962	A	32.275	28.248	12.729	21.03	0.000	0.000
						B	40.167	23.655		19.95	0.000	0.000
						C	24.067	39.613		19.99	0.000	0.000
T9 33.00-23.00	28.00	1	18	0.5000	229.962	A	32.865	28.396	12.729	20.78	0.000	0.000
						B	40.760	23.803		19.72	0.000	0.000
						C	24.655	39.760		19.76	0.000	0.000
T10 23.00-3.00	13.00	1	18	0.5000	489.924	A	67.608	57.261	25.459	20.39	0.000	0.000
						B	83.673	44.457		19.87	0.000	0.000

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	Client: SPRINT	Designed by: jrm

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
						C	49.764	66.753		21.85	0.000	0.000

Tower Pressure - Service

$G_H = 1.121$

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
T1 183.00-163.00	173.00	1.605	30	175.992	A	12.975	9.583	9.583	42.48	0.000	0.000
					B	12.900	10.550		40.87	0.000	0.000
					C	15.126	13.028		34.04	0.000	0.000
T2 163.00-143.00	153.00	1.55	29	196.398	A	11.385	9.600	9.600	45.75	0.000	0.000
					B	11.326	13.537		38.61	0.000	0.000
					C	13.426	19.498		29.16	0.000	0.000
T3 143.00-123.00	133.00	1.489	28	238.641	A	14.865	32.508	11.688	24.67	0.000	0.000
					B	16.243	23.279		29.57	0.000	0.000
					C	18.260	29.071		24.69	0.000	0.000
T4 123.00-103.00	113.00	1.421	26	282.010	A	16.163	49.727	15.027	22.81	0.000	0.000
					B	18.028	32.801		29.56	0.000	0.000
					C	20.432	33.336		27.95	0.000	0.000
T5 103.00-83.00	93.00	1.345	25	324.683	A	17.779	57.234	18.574	24.76	0.000	0.000
					B	17.333	70.008		21.27	0.000	0.000
					C	21.632	45.728		27.57	0.000	0.000
T6 83.00-63.00	73.00	1.255	23	364.683	A	20.849	63.174	18.574	22.11	0.000	0.000
					B	20.392	70.008		20.55	0.000	0.000
					C	24.333	57.608		22.67	0.000	0.000
T7 63.00-43.00	53.00	1.145	21	405.584	A	23.025	64.095	18.577	21.32	0.000	0.000
					B	22.578	70.010		20.06	0.000	0.000
					C	26.488	58.529		21.85	0.000	0.000
T8 43.00-33.00	38.00	1.041	19	219.128	A	14.074	33.843	11.060	23.08	0.000	0.000
					B	13.822	36.777		21.86	0.000	0.000
					C	15.858	31.060		23.57	0.000	0.000
T9 33.00-23.00	28.00	1	18	229.128	A	14.660	33.843	11.060	22.80	0.000	0.000
					B	14.411	36.777		21.61	0.000	0.000
					C	16.441	31.060		23.28	0.000	0.000
T10 23.00-3.00	13.00	1	18	488.255	A	31.191	67.687	22.120	22.37	0.000	0.000
					B	30.795	72.200		21.48	0.000	0.000
					C	33.511	55.587		24.83	0.000	0.000

Tower Forces - No Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1 183.00-163.00	0.03	0.93	A	0.128	2.853	0.578	1	1	18.518	2.07	103.42	C
			B	0.133	2.834	0.579	1	1	19.009			
			C	0.16	2.735	0.583	1	1	22.722			
T2 163.00-143.00	0.09	0.81	A	0.107	2.937	0.576	1	1	16.913	2.16	107.98	C
			B	0.127	2.859	0.578	1	1	19.153			

tnxTower	Job: 12047.CO6 ~ 180-ft Rohn SSV Lattice Tower	Page: 15 of 33
Centek Engineering Inc. 63-2 N. Branford Road Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Project: 20 Barnabas Rd, Newtown, CT	Date: 08:52:11 03/28/13
	Client: SPRINT	Designed by: jrm

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
			C	0.168	2.708	0.584	1	1	24.820			
T3	0.31	1.20	A	0.199	2.601	0.59	1	1	34.047	2.84	142.22	C
143.00-123.00			B	0.166	2.715	0.584	1	1	29.838			
			C	0.198	2.602	0.59	1	1	35.414			
T4	0.44	2.01	A	0.234	2.487	0.598	1	1	45.892	3.36	168.20	A
123.00-103.00			B	0.18	2.663	0.587	1	1	37.268			
			C	0.191	2.627	0.589	1	1	40.052			
T5	0.75	3.33	A	0.231	2.496	0.597	1	1	51.961	3.97	198.57	B
103.00-83.00			B	0.269	2.382	0.607	1	1	59.820			
			C	0.207	2.571	0.592	1	1	48.700			
T6	0.90	2.66	A	0.23	2.498	0.597	1	1	58.569	3.97	198.61	B
83.00-63.00			B	0.248	2.444	0.601	1	1	62.490			
			C	0.225	2.516	0.596	1	1	58.652			
T7	0.90	3.50	A	0.215	2.547	0.594	1	1	61.067	3.82	191.24	B
63.00-43.00			B	0.228	2.504	0.597	1	1	64.345			
			C	0.21	2.564	0.592	1	1	61.161			
T8	0.45	2.24	A	0.219	2.535	0.594	1	1	34.190	1.93	192.79	B
43.00-33.00			B	0.231	2.496	0.597	1	1	35.785			
			C	0.214	2.55	0.593	1	1	34.288			
T9	0.45	2.29	A	0.212	2.557	0.593	1	1	34.725	1.90	189.67	B
33.00-23.00			B	0.223	2.52	0.595	1	1	36.310			
			C	0.207	2.572	0.592	1	1	34.826			
T10	0.85	4.74	A	0.203	2.588	0.591	1	1	71.188	3.91	195.26	B
23.00-3.00			B	0.211	2.56	0.593	1	1	73.587			
			C	0.182	2.656	0.587	1	1	66.140			
Sum Weight:	5.18	23.70						OTM	2396.04 kip-ft	29.93		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.03	0.93	A	0.128	2.853	0.578	0.8	1	15.923	1.79	89.65	C
183.00-163.00			B	0.133	2.834	0.579	0.8	1	16.429			
			C	0.16	2.735	0.583	0.8	1	19.697			
T2	0.09	0.81	A	0.107	2.937	0.576	0.8	1	14.636	1.93	96.29	C
163.00-143.00			B	0.127	2.859	0.578	0.8	1	16.887			
			C	0.168	2.708	0.584	0.8	1	22.134			
T3	0.31	1.20	A	0.199	2.601	0.59	0.8	1	31.074	2.55	127.56	C
143.00-123.00			B	0.166	2.715	0.584	0.8	1	26.590			
			C	0.198	2.602	0.59	0.8	1	31.762			
T4	0.44	2.01	A	0.234	2.487	0.598	0.8	1	42.660	3.13	156.35	A
123.00-103.00			B	0.18	2.663	0.587	0.8	1	33.662			
			C	0.191	2.627	0.589	0.8	1	35.965			
T5	0.75	3.33	A	0.231	2.496	0.597	0.8	1	48.405	3.74	187.06	B
103.00-83.00			B	0.269	2.382	0.607	0.8	1	56.354			
			C	0.207	2.571	0.592	0.8	1	44.374			
T6	0.90	2.66	A	0.23	2.498	0.597	0.8	1	54.399	3.71	185.65	B
83.00-63.00			B	0.248	2.444	0.601	0.8	1	58.411			
			C	0.225	2.516	0.596	0.8	1	53.786			
T7	0.90	3.50	A	0.215	2.547	0.594	0.8	1	56.462	3.56	177.82	B
63.00-43.00			B	0.228	2.504	0.597	0.8	1	59.829			
			C	0.21	2.564	0.592	0.8	1	55.863			
T8	0.45	2.24	A	0.219	2.535	0.594	0.8	1	31.375	1.78	177.90	B

tnxTower	Job: 12047.CO6 ~ 180-ft Rohn SSV Lattice Tower	Page: 16 of 33
Centek Engineering Inc. 63-2 N. Branford Road Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Project: 20 Barnabas Rd, Newtown, CT	Date: 08:52:11 03/28/13
	Client: SPRINT	Designed by: jrm

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
43.00-33.00			B	0.231	2.496	0.597	0.8	1	33.020			
			C	0.214	2.55	0.593	0.8	1	31.117			
T9	0.45	2.29	A	0.212	2.557	0.593	0.8	1	31.793	1.75	174.62	B
33.00-23.00			B	0.223	2.52	0.595	0.8	1	33.428			
			C	0.207	2.572	0.592	0.8	1	31.538			
T10	0.85	4.74	A	0.203	2.588	0.591	0.8	1	64.950	3.58	178.92	B
23.00-3.00			B	0.211	2.56	0.593	0.8	1	67.428			
			C	0.182	2.656	0.587	0.8	1	59.438			
Sum Weight:	5.18	23.70						OTM	2185.46 kip-ft	27.51		

Tower Forces - No Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.03	0.93	A	0.128	2.853	0.578	0.85	1	16.572	1.86	93.09	C
183.00-163.00			B	0.133	2.834	0.579	0.85	1	17.074			
			C	0.16	2.735	0.583	0.85	1	20.453			
T2	0.09	0.81	A	0.107	2.937	0.576	0.85	1	15.205	1.98	99.21	C
163.00-143.00			B	0.127	2.859	0.578	0.85	1	17.454			
			C	0.168	2.708	0.584	0.85	1	22.806			
T3	0.31	1.20	A	0.199	2.601	0.59	0.85	1	31.818	2.62	131.22	C
143.00-123.00			B	0.166	2.715	0.584	0.85	1	27.402			
			C	0.198	2.602	0.59	0.85	1	32.675			
T4	0.44	2.01	A	0.234	2.487	0.598	0.85	1	43.468	3.19	159.32	A
123.00-103.00			B	0.18	2.663	0.587	0.85	1	34.564			
			C	0.191	2.627	0.589	0.85	1	36.987			
T5	0.75	3.33	A	0.231	2.496	0.597	0.85	1	49.294	3.80	189.94	B
103.00-83.00			B	0.269	2.382	0.607	0.85	1	57.221			
			C	0.207	2.571	0.592	0.85	1	45.455			
T6	0.90	2.66	A	0.23	2.498	0.597	0.85	1	55.441	3.78	188.89	B
83.00-63.00			B	0.248	2.444	0.601	0.85	1	59.431			
			C	0.225	2.516	0.596	0.85	1	55.002			
T7	0.90	3.50	A	0.215	2.547	0.594	0.85	1	57.614	3.62	181.18	B
63.00-43.00			B	0.228	2.504	0.597	0.85	1	60.958			
			C	0.21	2.564	0.592	0.85	1	57.188			
T8	0.45	2.24	A	0.219	2.535	0.594	0.85	1	32.079	1.82	181.62	B
43.00-33.00			B	0.231	2.496	0.597	0.85	1	33.712			
			C	0.214	2.55	0.593	0.85	1	31.910			
T9	0.45	2.29	A	0.212	2.557	0.593	0.85	1	32.526	1.78	178.38	B
33.00-23.00			B	0.223	2.52	0.595	0.85	1	34.148			
			C	0.207	2.572	0.592	0.85	1	32.360			
T10	0.85	4.74	A	0.203	2.588	0.591	0.85	1	66.509	3.66	183.01	B
23.00-3.00			B	0.211	2.56	0.593	0.85	1	68.968			
			C	0.182	2.656	0.587	0.85	1	61.113			
Sum Weight:	5.18	23.70						OTM	2238.11 kip-ft	28.12		

Tower Forces - With Ice - Wind Normal To Face

tnxTower	Job: 12047.CO6 ~ 180-ft Rohn SSV Lattice Tower	Page: 17 of 33
Centek Engineering Inc. 63-2 N. Branford Road Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Project: 20 Barnabas Rd, Newtown, CT	Date: 08:52:11 03/28/13
	Client: SPRINT	Designed by: jrm

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1 183.00-163.00	0.12	1.53	A	0.186	2.644	0.588	1	1	24.747	2.63	131.74	C
			B	0.199	2.6	0.59	1	1	26.081			
			C	0.243	2.459	0.6	1	1	32.190			
T2 163.00-143.00	0.27	1.34	A	0.152	2.766	0.582	1	1	22.223	2.89	144.35	C
			B	0.184	2.651	0.587	1	1	27.019			
			C	0.256	2.419	0.603	1	1	37.138			
T3 143.00-123.00	0.83	1.91	A	0.26	2.408	0.604	1	1	50.342	3.78	189.07	C
			B	0.23	2.498	0.597	1	1	42.816			
			C	0.286	2.334	0.612	1	1	52.471			
T4 123.00-103.00	1.17	2.84	A	0.301	2.293	0.616	1	1	69.692	4.71	235.42	A
			B	0.244	2.456	0.6	1	1	54.633			
			C	0.271	2.377	0.607	1	1	58.047			
T5 103.00-83.00	1.94	4.33	A	0.286	2.335	0.612	1	1	77.517	5.93	296.43	B
			B	0.339	2.198	0.629	1	1	96.767			
			C	0.28	2.352	0.61	1	1	70.097			
T6 83.00-63.00	2.24	3.64	A	0.291	2.321	0.613	1	1	87.508	5.84	292.15	B
			B	0.316	2.254	0.621	1	1	99.673			
			C	0.308	2.275	0.618	1	1	85.361			
T7 63.00-43.00	2.26	4.55	A	0.275	2.365	0.608	1	1	91.378	5.61	280.58	B
			B	0.291	2.319	0.613	1	1	101.944			
			C	0.29	2.323	0.613	1	1	89.068			
T8 43.00-33.00	1.13	2.86	A	0.275	2.364	0.609	1	1	49.467	2.74	274.04	B
			B	0.29	2.323	0.613	1	1	54.666			
			C	0.29	2.324	0.613	1	1	48.339			
T9 33.00-23.00	1.13	2.93	A	0.266	2.389	0.606	1	1	50.078	2.69	269.17	B
			B	0.281	2.348	0.61	1	1	55.285			
			C	0.28	2.35	0.61	1	1	48.909			
T10 23.00-3.00	2.10	6.09	A	0.255	2.423	0.603	1	1	102.143	5.51	275.45	B
			B	0.262	2.403	0.605	1	1	110.564			
			C	0.238	2.475	0.599	1	1	89.738			
Sum Weight:	13.17	32.00						OTM	3331.92 kip-ft	42.34		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1 183.00-163.00	0.12	1.53	A	0.186	2.644	0.588	0.8	1	22.152	2.38	118.83	C
			B	0.199	2.6	0.59	0.8	1	23.527			
			C	0.243	2.459	0.6	0.8	1	29.037			
T2 163.00-143.00	0.27	1.34	A	0.152	2.766	0.582	0.8	1	19.946	2.63	131.57	C
			B	0.184	2.651	0.587	0.8	1	24.278			
			C	0.256	2.419	0.603	0.8	1	33.850			
T3 143.00-123.00	0.83	1.91	A	0.26	2.408	0.604	0.8	1	43.990	3.39	169.68	C
			B	0.23	2.498	0.597	0.8	1	37.957			
			C	0.286	2.334	0.612	0.8	1	47.088			
T4 123.00-103.00	1.17	2.84	A	0.301	2.293	0.616	0.8	1	60.824	4.11	205.46	A
			B	0.244	2.456	0.6	0.8	1	48.079			
			C	0.271	2.377	0.607	0.8	1	52.236			
T5 103.00-83.00	1.94	4.33	A	0.286	2.335	0.612	0.8	1	66.968	5.03	251.44	B
			B	0.339	2.198	0.629	0.8	1	82.079			
			C	0.28	2.352	0.61	0.8	1	62.683			
T6 83.00-63.00	2.24	3.64	A	0.291	2.321	0.613	0.8	1	76.044	4.99	249.25	B
			B	0.316	2.254	0.621	0.8	1	85.038			

tnxTower	Job: 12047.CO6 ~ 180-ft Rohn SSV Lattice Tower	Page: 18 of 33
Centek Engineering Inc. 63-2 N. Branford Road Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Project: 20 Barnabas Rd, Newtown, CT	Date: 08:52:11 03/28/13
	Client: SPRINT	Designed by: jrm

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
			C	0.308	2.275	0.618	0.8	1	77.189			
T7	2.26	4.55	A	0.275	2.365	0.608	0.8	1	79.475	4.78	239.08	B
63.00-43.00			B	0.291	2.319	0.613	0.8	1	86.867			
			C	0.29	2.323	0.613	0.8	1	80.459			
T8	1.13	2.86	A	0.275	2.364	0.609	0.8	1	43.012	2.34	233.77	B
43.00-33.00			B	0.29	2.323	0.613	0.8	1	46.633			
			C	0.29	2.324	0.613	0.8	1	43.526			
T9	1.13	2.93	A	0.266	2.389	0.606	0.8	1	43.505	2.29	229.48	B
33.00-23.00			B	0.281	2.348	0.61	0.8	1	47.133			
			C	0.28	2.35	0.61	0.8	1	43.978			
T10	2.10	6.09	A	0.255	2.423	0.603	0.8	1	88.622	4.68	233.76	B
23.00-3.00			B	0.262	2.403	0.605	0.8	1	93.829			
			C	0.238	2.475	0.599	0.8	1	79.786			
Sum Weight:	13.17	32.00						OTM	2918.48 kip-ft	36.61		

Tower Forces - With Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.12	1.53	A	0.186	2.644	0.588	0.85	1	22.801	2.44	122.06	C
183.00-163.00			B	0.199	2.6	0.59	0.85	1	24.165			
			C	0.243	2.459	0.6	0.85	1	29.826			
T2	0.27	1.34	A	0.152	2.766	0.582	0.85	1	20.516	2.70	134.76	C
163.00-143.00			B	0.184	2.651	0.587	0.85	1	24.963			
			C	0.256	2.419	0.603	0.85	1	34.672			
T3	0.83	1.91	A	0.26	2.408	0.604	0.85	1	45.578	3.49	174.53	C
143.00-123.00			B	0.23	2.498	0.597	0.85	1	39.172			
			C	0.286	2.334	0.612	0.85	1	48.433			
T4	1.17	2.84	A	0.301	2.293	0.616	0.85	1	63.041	4.26	212.95	A
123.00-103.00			B	0.244	2.456	0.6	0.85	1	49.718			
			C	0.271	2.377	0.607	0.85	1	53.688			
T5	1.94	4.33	A	0.286	2.335	0.612	0.85	1	69.605	5.25	262.69	B
103.00-83.00			B	0.339	2.198	0.629	0.85	1	85.751			
			C	0.28	2.352	0.61	0.85	1	64.537			
T6	2.24	3.64	A	0.291	2.321	0.613	0.85	1	78.910	5.20	259.98	B
83.00-63.00			B	0.316	2.254	0.621	0.85	1	88.697			
			C	0.308	2.275	0.618	0.85	1	79.232			
T7	2.26	4.55	A	0.275	2.365	0.608	0.85	1	82.450	4.99	249.46	B
63.00-43.00			B	0.291	2.319	0.613	0.85	1	90.636			
			C	0.29	2.323	0.613	0.85	1	82.611			
T8	1.13	2.86	A	0.275	2.364	0.609	0.85	1	44.626	2.44	243.84	B
43.00-33.00			B	0.29	2.323	0.613	0.85	1	48.641			
			C	0.29	2.324	0.613	0.85	1	44.729			
T9	1.13	2.93	A	0.266	2.389	0.606	0.85	1	45.148	2.39	239.40	B
33.00-23.00			B	0.281	2.348	0.61	0.85	1	49.171			
			C	0.28	2.35	0.61	0.85	1	45.211			
T10	2.10	6.09	A	0.255	2.423	0.603	0.85	1	92.002	4.88	244.18	B
23.00-3.00			B	0.262	2.403	0.605	0.85	1	98.013			
			C	0.238	2.475	0.599	0.85	1	82.274			
Sum Weight:	13.17	32.00						OTM	3021.84 kip-ft	38.04		

tnxTower	Job: 12047.CO6 ~ 180-ft Rohn SSV Lattice Tower	Page: 19 of 33
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	Client: SPRINT	Designed by: jrm

Tower Forces - Service - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.03	0.93	A	0.128	2.853	0.578	1	1	18.518	2.07	103.42	C
183.00-163.00			B	0.133	2.834	0.579	1	1	19.009			
			C	0.16	2.735	0.583	1	1	22.722			
T2	0.09	0.81	A	0.107	2.937	0.576	1	1	16.913	2.16	107.98	C
163.00-143.00			B	0.127	2.859	0.578	1	1	19.153			
			C	0.168	2.708	0.584	1	1	24.820			
T3	0.31	1.20	A	0.199	2.601	0.59	1	1	34.047	2.84	142.22	C
143.00-123.00			B	0.166	2.715	0.584	1	1	29.838			
			C	0.198	2.602	0.59	1	1	35.414			
T4	0.44	2.01	A	0.234	2.487	0.598	1	1	45.892	3.36	168.20	A
123.00-103.00			B	0.18	2.663	0.587	1	1	37.268			
			C	0.191	2.627	0.589	1	1	40.052			
T5	0.75	3.33	A	0.231	2.496	0.597	1	1	51.961	3.97	198.57	B
103.00-83.00			B	0.269	2.382	0.607	1	1	59.820			
			C	0.207	2.571	0.592	1	1	48.700			
T6	0.90	2.66	A	0.23	2.498	0.597	1	1	58.569	3.97	198.61	B
83.00-63.00			B	0.248	2.444	0.601	1	1	62.490			
			C	0.225	2.516	0.596	1	1	58.652			
T7	0.90	3.50	A	0.215	2.547	0.594	1	1	61.067	3.82	191.24	B
63.00-43.00			B	0.228	2.504	0.597	1	1	64.345			
			C	0.21	2.564	0.592	1	1	61.161			
T8	0.45	2.24	A	0.219	2.535	0.594	1	1	34.190	1.93	192.79	B
43.00-33.00			B	0.231	2.496	0.597	1	1	35.785			
			C	0.214	2.55	0.593	1	1	34.288			
T9	0.45	2.29	A	0.212	2.557	0.593	1	1	34.725	1.90	189.67	B
33.00-23.00			B	0.223	2.52	0.595	1	1	36.310			
			C	0.207	2.572	0.592	1	1	34.826			
T10	0.85	4.74	A	0.203	2.588	0.591	1	1	71.188	3.91	195.26	B
23.00-3.00			B	0.211	2.56	0.593	1	1	73.587			
			C	0.182	2.656	0.587	1	1	66.140			
Sum Weight:	5.18	23.70						OTM	2396.04 kip-ft	29.93		

Tower Forces - Service - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.03	0.93	A	0.128	2.853	0.578	0.8	1	15.923	1.79	89.65	C
183.00-163.00			B	0.133	2.834	0.579	0.8	1	16.429			
			C	0.16	2.735	0.583	0.8	1	19.697			
T2	0.09	0.81	A	0.107	2.937	0.576	0.8	1	14.636	1.93	96.29	C
163.00-143.00			B	0.127	2.859	0.578	0.8	1	16.887			
			C	0.168	2.708	0.584	0.8	1	22.134			
T3	0.31	1.20	A	0.199	2.601	0.59	0.8	1	31.074	2.55	127.56	C
143.00-123.00			B	0.166	2.715	0.584	0.8	1	26.590			
			C	0.198	2.602	0.59	0.8	1	31.762			
T4	0.44	2.01	A	0.234	2.487	0.598	0.8	1	42.660	3.13	156.35	A
123.00-103.00			B	0.18	2.663	0.587	0.8	1	33.662			

tnxTower	Job: 12047.CO6 ~ 180-ft Rohn SSV Lattice Tower	Page: 20 of 33
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	Client: SPRINT	Designed by: jrm

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
			C	0.191	2.627	0.589	0.8	1	35.965			
T5	0.75	3.33	A	0.231	2.496	0.597	0.8	1	48.405	3.74	187.06	B
103.00-83.00			B	0.269	2.382	0.607	0.8	1	56.354			
			C	0.207	2.571	0.592	0.8	1	44.374			
T6	0.90	2.66	A	0.23	2.498	0.597	0.8	1	54.399	3.71	185.65	B
83.00-63.00			B	0.248	2.444	0.601	0.8	1	58.411			
			C	0.225	2.516	0.596	0.8	1	53.786			
T7	0.90	3.50	A	0.215	2.547	0.594	0.8	1	56.462	3.56	177.82	B
63.00-43.00			B	0.228	2.504	0.597	0.8	1	59.829			
			C	0.21	2.564	0.592	0.8	1	55.863			
T8	0.45	2.24	A	0.219	2.535	0.594	0.8	1	31.375	1.78	177.90	B
43.00-33.00			B	0.231	2.496	0.597	0.8	1	33.020			
			C	0.214	2.55	0.593	0.8	1	31.117			
T9	0.45	2.29	A	0.212	2.557	0.593	0.8	1	31.793	1.75	174.62	B
33.00-23.00			B	0.223	2.52	0.595	0.8	1	33.428			
			C	0.207	2.572	0.592	0.8	1	31.538			
T10	0.85	4.74	A	0.203	2.588	0.591	0.8	1	64.950	3.58	178.92	B
23.00-3.00			B	0.211	2.56	0.593	0.8	1	67.428			
			C	0.182	2.656	0.587	0.8	1	59.438			
Sum Weight:	5.18	23.70						OTM	2185.46 kip-ft	27.51		

Tower Forces - Service - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.03	0.93	A	0.128	2.853	0.578	0.85	1	16.572	1.86	93.09	C
183.00-163.00			B	0.133	2.834	0.579	0.85	1	17.074			
			C	0.16	2.735	0.583	0.85	1	20.453			
T2	0.09	0.81	A	0.107	2.937	0.576	0.85	1	15.205	1.98	99.21	C
163.00-143.00			B	0.127	2.859	0.578	0.85	1	17.454			
			C	0.168	2.708	0.584	0.85	1	22.806			
T3	0.31	1.20	A	0.199	2.601	0.59	0.85	1	31.818	2.62	131.22	C
143.00-123.00			B	0.166	2.715	0.584	0.85	1	27.402			
			C	0.198	2.602	0.59	0.85	1	32.675			
T4	0.44	2.01	A	0.234	2.487	0.598	0.85	1	43.468	3.19	159.32	A
123.00-103.00			B	0.18	2.663	0.587	0.85	1	34.564			
			C	0.191	2.627	0.589	0.85	1	36.987			
T5	0.75	3.33	A	0.231	2.496	0.597	0.85	1	49.294	3.80	189.94	B
103.00-83.00			B	0.269	2.382	0.607	0.85	1	57.221			
			C	0.207	2.571	0.592	0.85	1	45.455			
T6	0.90	2.66	A	0.23	2.498	0.597	0.85	1	55.441	3.78	188.89	B
83.00-63.00			B	0.248	2.444	0.601	0.85	1	59.431			
			C	0.225	2.516	0.596	0.85	1	55.002			
T7	0.90	3.50	A	0.215	2.547	0.594	0.85	1	57.614	3.62	181.18	B
63.00-43.00			B	0.228	2.504	0.597	0.85	1	60.958			
			C	0.21	2.564	0.592	0.85	1	57.188			
T8	0.45	2.24	A	0.219	2.535	0.594	0.85	1	32.079	1.82	181.62	B
43.00-33.00			B	0.231	2.496	0.597	0.85	1	33.712			
			C	0.214	2.55	0.593	0.85	1	31.910			
T9	0.45	2.29	A	0.212	2.557	0.593	0.85	1	32.526	1.78	178.38	B
33.00-23.00			B	0.223	2.52	0.595	0.85	1	34.148			
			C	0.207	2.572	0.592	0.85	1	32.360			
T10	0.85	4.74	A	0.203	2.588	0.591	0.85	1	66.509	3.66	183.01	B

tnxTower	Job: 12047.CO6 ~ 180-ft Rohn SSV Lattice Tower	Page: 21 of 33
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	Client: SPRINT	Designed by: jrm

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
23.00-3.00			B	0.211	2.56	0.593	0.85	1	68.968			
			C	0.182	2.656	0.587	0.85	1	61.113			
Sum Weight:	5.18	23.70						OTM	2238.11 kip-ft	28.12		

Force Totals

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Leg Weight	8.98					
Bracing Weight	14.72					
Total Member Self-Weight	23.70			-3.58	6.19	
Total Weight	39.09			-3.58	6.19	
Wind 0 deg - No Ice		0.06	-40.35	-3612.94	1.16	-8.42
Wind 30 deg - No Ice		19.29	-33.32	-2981.76	-1715.60	-16.05
Wind 60 deg - No Ice		32.71	-18.84	-1676.72	-2904.21	-19.04
Wind 90 deg - No Ice		38.34	0.06	13.77	-3405.00	-17.48
Wind 120 deg - No Ice		34.89	20.19	1808.92	-3107.21	-11.74
Wind 150 deg - No Ice		19.31	33.49	3010.37	-1729.92	-1.68
Wind 180 deg - No Ice		-0.06	38.09	3424.15	11.22	8.10
Wind 210 deg - No Ice		-19.42	33.55	3015.40	1751.01	15.84
Wind 240 deg - No Ice		-34.95	20.30	1817.63	3124.62	20.16
Wind 270 deg - No Ice		-38.34	23.82	23.82	3417.38	17.48
Wind 300 deg - No Ice		-32.64	-18.74	-1668.01	2911.56	10.95
Wind 330 deg - No Ice		-19.18	-33.26	-2976.73	1719.27	1.88
Member Ice	8.30					
Total Weight Ice	60.75			-13.03	10.45	
Wind 0 deg - Ice		0.07	-55.37	-4856.64	5.19	-4.19
Wind 30 deg - Ice		25.57	-44.19	-3928.09	-2252.47	-12.47
Wind 60 deg - Ice		42.86	-24.70	-2201.23	-3792.47	-16.73
Wind 90 deg - Ice		50.89	0.06	4.70	-4481.94	-17.81
Wind 120 deg - Ice		47.90	27.70	2416.73	-4171.63	-15.41
Wind 150 deg - Ice		25.59	44.36	3938.70	-2267.03	-5.59
Wind 180 deg - Ice		-0.07	49.81	4446.89	15.71	3.74
Wind 210 deg - Ice		-25.70	44.43	3943.95	2297.03	12.26
Wind 240 deg - Ice		-47.96	27.81	2425.83	4197.79	19.60
Wind 270 deg - Ice		-50.89	0.20	15.21	4502.84	17.81
Wind 300 deg - Ice		-42.79	-24.59	-2192.12	3808.11	12.99
Wind 330 deg - Ice		-25.45	-44.12	-3922.84	2264.26	5.80
Total Weight	39.09			-3.58	6.19	
Wind 0 deg - Service		0.06	-40.35	-3609.03	-3.83	-8.42
Wind 30 deg - Service		19.29	-33.32	-2977.86	-1720.60	-16.05
Wind 60 deg - Service		32.71	-18.84	-1672.82	-2909.20	-19.04
Wind 90 deg - Service		38.34	0.06	17.67	-3410.00	-17.48
Wind 120 deg - Service		34.89	20.19	1812.82	-3112.21	-11.74
Wind 150 deg - Service		19.31	33.49	3014.27	-1734.92	-1.68
Wind 180 deg - Service		-0.06	38.09	3428.05	6.22	8.10
Wind 210 deg - Service		-19.42	33.55	3019.30	1746.01	15.84
Wind 240 deg - Service		-34.95	20.30	1821.53	3119.62	20.16
Wind 270 deg - Service		-38.34	0.19	27.72	3412.38	17.48
Wind 300 deg - Service		-32.64	-18.74	-1664.11	2906.56	10.95
Wind 330 deg - Service		-19.18	-33.26	-2972.83	1714.28	1.88

tnxTower	Job: 12047.CO6 ~ 180-ft Rohn SSV Lattice Tower	Page: 22 of 33
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	Client: SPRINT	Designed by: jrm

Load Combinations

Comb. No.	Description
1	Dead Only
2	Dead+Wind 0 deg - No Ice
3	Dead+Wind 30 deg - No Ice
4	Dead+Wind 60 deg - No Ice
5	Dead+Wind 90 deg - No Ice
6	Dead+Wind 120 deg - No Ice
7	Dead+Wind 150 deg - No Ice
8	Dead+Wind 180 deg - No Ice
9	Dead+Wind 210 deg - No Ice
10	Dead+Wind 240 deg - No Ice
11	Dead+Wind 270 deg - No Ice
12	Dead+Wind 300 deg - No Ice
13	Dead+Wind 330 deg - No Ice
14	Dead+Ice+Temp
15	Dead+Wind 0 deg+Ice+Temp
16	Dead+Wind 30 deg+Ice+Temp
17	Dead+Wind 60 deg+Ice+Temp
18	Dead+Wind 90 deg+Ice+Temp
19	Dead+Wind 120 deg+Ice+Temp
20	Dead+Wind 150 deg+Ice+Temp
21	Dead+Wind 180 deg+Ice+Temp
22	Dead+Wind 210 deg+Ice+Temp
23	Dead+Wind 240 deg+Ice+Temp
24	Dead+Wind 270 deg+Ice+Temp
25	Dead+Wind 300 deg+Ice+Temp
26	Dead+Wind 330 deg+Ice+Temp
27	Dead+Wind 0 deg - Service
28	Dead+Wind 30 deg - Service
29	Dead+Wind 60 deg - Service
30	Dead+Wind 90 deg - Service
31	Dead+Wind 120 deg - Service
32	Dead+Wind 150 deg - Service
33	Dead+Wind 180 deg - Service
34	Dead+Wind 210 deg - Service
35	Dead+Wind 240 deg - Service
36	Dead+Wind 270 deg - Service
37	Dead+Wind 300 deg - Service
38	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T1	183 - 163	Leg	Max Tension	21	5.11	-0.00	-0.02
			Max. Compression	15	-6.77	0.04	0.11
			Max. Mx	19	-0.23	0.37	-0.10
			Max. My	20	-0.77	-0.08	0.36
			Max. Vy	18	0.31	-0.24	-0.03
			Max. Vx	21	-0.31	0.00	0.00
		Diagonal	Max Tension	20	1.56	0.00	0.00
			Max. Compression	20	-1.60	0.00	0.00
			Max. Mx	26	0.32	0.01	-0.00

tnxTower	Job: 12047.CO6 ~ 180-ft Rohn SSV Lattice Tower	Page: 23 of 33
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	Client: SPRINT	Designed by: jrm

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. My	19	-1.19	0.01	0.00
			Max. Vy	26	-0.01	0.01	-0.00
			Max. Vx	19	0.00	0.00	0.00
		Top Girt	Max Tension	19	0.06	0.00	0.00
			Max. Compression	17	-0.15	0.00	0.00
			Max. Mx	14	-0.03	-0.05	0.00
			Max. My	26	-0.03	0.00	-0.00
			Max. Vy	14	0.02	0.00	0.00
			Max. Vx	26	0.00	0.00	0.00
T2	163 - 143	Leg	Max Tension	21	14.94	-0.16	0.00
			Max. Compression	19	-17.99	0.01	0.01
			Max. Mx	15	-13.51	0.18	-0.01
			Max. My	22	-1.69	-0.02	0.21
			Max. Vy	17	-0.34	-0.16	-0.02
			Max. Vx	26	0.34	0.01	0.05
		Diagonal	Max Tension	20	2.49	0.00	0.00
			Max. Compression	20	-2.49	0.00	0.00
			Max. Mx	20	1.12	0.02	0.00
			Max. My	26	-2.43	0.01	-0.01
			Max. Vy	20	0.01	0.02	0.00
			Max. Vx	26	0.00	0.00	0.00
T3	143 - 123	Leg	Max Tension	21	29.24	-0.24	0.01
			Max. Compression	19	-36.42	0.18	0.01
			Max. Mx	17	21.73	0.51	0.02
			Max. My	26	-2.51	-0.05	-0.62
			Max. Vy	25	-0.74	-0.47	-0.02
			Max. Vx	26	0.66	0.01	0.26
		Diagonal	Max Tension	20	4.13	0.00	0.00
			Max. Compression	20	-4.24	0.00	0.00
			Max. Mx	20	1.78	0.05	0.00
			Max. My	20	-3.77	0.01	0.01
			Max. Vy	20	-0.02	0.05	0.00
			Max. Vx	20	-0.00	0.00	0.00
T4	123 - 103	Leg	Max Tension	21	47.58	-0.76	-0.02
			Max. Compression	19	-60.80	0.65	0.06
			Max. Mx	17	43.03	1.53	0.02
			Max. My	16	-6.44	-0.20	1.48
			Max. Vy	21	0.86	-1.01	0.03
			Max. Vx	18	-0.84	-0.21	0.99
		Diagonal	Max Tension	20	5.57	0.00	0.00
			Max. Compression	20	-5.44	0.00	0.00
			Max. Mx	20	1.74	0.06	0.01
			Max. My	20	-5.41	0.03	0.01
			Max. Vy	22	0.03	0.06	-0.01
			Max. Vx	20	-0.00	0.00	0.00
T5	103 - 83	Leg	Max Tension	21	68.40	-0.93	-0.03
			Max. Compression	15	-91.37	0.52	0.03
			Max. Mx	17	63.53	1.57	0.04
			Max. My	26	-7.72	0.09	-1.35
			Max. Vy	17	-1.27	-0.94	0.05
			Max. Vx	18	1.22	0.10	1.11
		Diagonal	Max Tension	20	9.36	0.00	0.00
			Max. Compression	20	-9.06	0.00	0.00
			Max. Mx	21	5.81	-0.18	-0.01
			Max. My	20	-7.73	-0.10	-0.03
			Max. Vy	21	-0.08	-0.18	0.02
			Max. Vx	21	0.01	0.00	0.00
T6	83 - 63	Leg	Max Tension	21	96.52	0.17	-0.00
			Max. Compression	15	-128.43	0.09	0.02
			Max. Mx	17	79.40	-1.09	0.04
			Max. My	24	-9.96	-0.30	-0.82

tnxTower	Job: 12047.CO6 ~ 180-ft Rohn SSV Lattice Tower	Page: 24 of 33
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	Client: SPRINT	Designed by: jrm

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vy	21	-0.21	-1.08	-0.03
			Max. Vx	24	-0.17	-0.30	-0.82
		Diagonal	Max Tension	20	10.29	0.00	0.00
			Max. Compression	20	-10.09	0.00	0.00
			Max. Mx	15	8.71	0.15	0.01
			Max. My	25	-8.01	0.07	-0.02
			Max. Vy	21	0.05	0.13	-0.01
			Max. Vx	19	0.00	0.00	0.00
T7	63 - 43	Leg	Max Tension	21	125.02	0.37	-0.02
			Max. Compression	15	-165.16	-0.49	0.02
			Max. Mx	21	124.71	-1.57	-0.01
			Max. My	24	-12.09	0.65	-0.49
			Max. Vy	21	0.28	-1.57	-0.01
			Max. Vx	23	-0.12	-0.80	-0.47
		Diagonal	Max Tension	20	11.12	0.00	0.00
			Max. Compression	20	-10.87	0.00	0.00
			Max. Mx	21	7.79	0.24	0.02
			Max. My	25	-9.16	0.16	-0.03
			Max. Vy	21	0.08	0.24	0.02
			Max. Vx	25	0.00	0.00	0.00
T8	43 - 33	Leg	Max Tension	21	140.49	-1.57	-0.01
			Max. Compression	15	-182.33	2.34	0.01
			Max. Mx	19	-181.17	2.35	0.03
			Max. My	24	-14.19	1.80	-0.80
			Max. Vy	21	-0.38	-1.57	-0.01
			Max. Vx	24	0.14	1.80	-0.80
		Diagonal	Max Tension	20	10.21	0.00	0.00
			Max. Compression	20	-12.16	0.00	0.00
			Max. Mx	21	7.85	0.34	0.03
			Max. My	25	-10.45	0.25	-0.03
			Max. Vy	21	0.10	0.34	0.03
			Max. Vx	25	0.01	0.00	0.00
T9	33 - 23	Leg	Max Tension	21	152.25	1.32	-0.01
			Max. Compression	15	-202.16	-1.64	0.02
			Max. Mx	21	151.86	-2.97	-0.02
			Max. My	24	-16.92	1.80	-0.80
			Max. Vy	21	0.52	-2.97	-0.02
			Max. Vx	24	-0.16	1.80	-0.80
		Diagonal	Max Tension	22	12.71	0.00	0.00
			Max. Compression	22	-10.24	0.00	0.00
			Max. Mx	10	6.91	0.22	-0.02
			Max. My	19	1.53	0.17	0.03
			Max. Vy	21	0.09	0.21	0.03
			Max. Vx	19	0.00	0.00	0.00
T10	23 - 3	Leg	Max Tension	21	178.69	1.70	-0.04
			Max. Compression	15	-239.09	-0.00	0.00
			Max. Mx	21	168.79	-2.97	-0.02
			Max. My	24	-16.26	2.25	-1.31
			Max. Vy	21	-0.56	-2.97	-0.02
			Max. Vx	23	-0.24	1.94	-1.24
		Diagonal	Max Tension	22	14.33	0.00	0.00
			Max. Compression	22	-13.79	0.00	0.00
			Max. Mx	21	7.18	0.43	-0.03
			Max. My	22	-13.72	0.30	-0.05
			Max. Vy	21	0.11	0.43	-0.03
			Max. Vx	22	0.01	0.00	0.00

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	Client: SPRINT	Designed by: jrm

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Leg C	Max. Vert	23	246.09	25.57	-15.31
	Max. H_x	23	246.09	25.57	-15.31
	Max. H_z	16	-162.10	-22.61	16.03
	Min. Vert	17	-184.01	-26.32	15.63
	Min. H_x	17	-184.01	-26.32	15.63
	Min. H_z	23	246.09	25.57	-15.31
Leg B	Max. Vert	19	244.82	-25.56	-15.17
	Max. H_x	25	-184.43	26.32	15.54
	Max. H_z	26	-162.46	22.63	15.87
	Min. Vert	25	-184.43	26.32	15.54
	Min. H_x	19	244.82	-25.56	-15.17
	Min. H_z	19	244.82	-25.56	-15.17
Leg A	Max. Vert	15	246.48	-0.11	29.77
	Max. H_x	24	19.54	5.00	-2.19
	Max. H_z	15	246.48	-0.11	29.77
	Min. Vert	21	-186.90	0.08	-30.84
	Min. H_x	18	20.03	-5.02	-2.12
	Min. H_z	21	-186.90	0.08	-30.84

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	39.09	0.00	0.00	-3.58	6.19	0.00
Dead+Wind 0 deg - No Ice	39.09	0.06	-40.35	-3620.18	1.16	-8.43
Dead+Wind 30 deg - No Ice	39.09	19.29	-33.32	-2987.73	-1719.02	-16.05
Dead+Wind 60 deg - No Ice	39.09	32.71	-18.84	-1680.07	-2909.99	-19.05
Dead+Wind 90 deg - No Ice	39.09	38.34	0.06	13.79	-3411.80	-17.49
Dead+Wind 120 deg - No Ice	39.09	34.89	20.19	1812.55	-3113.45	-11.74
Dead+Wind 150 deg - No Ice	39.09	19.31	33.49	3016.42	-1733.41	-1.67
Dead+Wind 180 deg - No Ice	39.09	-0.06	38.09	3431.02	11.23	8.10
Dead+Wind 210 deg - No Ice	39.09	-19.42	33.55	3021.45	1754.53	15.85
Dead+Wind 240 deg - No Ice	39.09	-34.95	20.30	1821.27	3130.88	20.18
Dead+Wind 270 deg - No Ice	39.09	-38.34	0.19	23.86	3424.18	17.49
Dead+Wind 300 deg - No Ice	39.09	-32.64	-18.74	-1671.34	2917.34	10.95
Dead+Wind 330 deg - No Ice	39.09	-19.18	-33.26	-2982.69	1722.70	1.88
Dead+Ice+Temp	60.75	0.00	0.00	-13.05	10.46	0.00
Dead+Wind 0 deg+Ice+Temp	60.75	0.07	-55.37	-4870.56	5.20	-4.19
Dead+Wind 30 deg+Ice+Temp	60.75	25.57	-44.19	-3939.35	-2258.94	-12.49
Dead+Wind 60 deg+Ice+Temp	60.75	42.86	-24.70	-2207.53	-3803.35	-16.75
Dead+Wind 90 deg+Ice+Temp	60.75	50.88	0.06	4.73	-4494.78	-17.83
Dead+Wind 120 deg+Ice+Temp	60.75	47.90	27.70	2423.61	-4183.64	-15.43
Dead+Wind 150 deg+Ice+Temp	60.75	25.59	44.36	3950.05	-2273.59	-5.60
Dead+Wind 180 deg+Ice+Temp	60.75	-0.07	49.81	4459.74	15.72	3.74
Dead+Wind 210 deg+Ice+Temp	60.75	-25.70	44.43	3955.32	2303.61	12.28
Dead+Wind 240 deg+Ice+Temp	60.75	-47.96	27.81	2432.73	4209.82	19.63
Dead+Wind 270 deg+Ice+Temp	60.75	-50.88	0.20	15.26	4515.69	17.83
Dead+Wind 300 deg+Ice+Temp	60.75	-42.79	-24.59	-2198.41	3818.99	13.01
Dead+Wind 330 deg+Ice+Temp	60.75	-25.45	-44.12	-3934.09	2270.72	5.81
Dead+Wind 0 deg - Service	39.09	0.06	-40.35	-3620.18	1.16	-8.43
Dead+Wind 30 deg - Service	39.09	19.29	-33.32	-2987.73	-1719.02	-16.05
Dead+Wind 60 deg - Service	39.09	32.71	-18.84	-1680.07	-2909.99	-19.05
Dead+Wind 90 deg - Service	39.09	38.34	0.06	13.79	-3411.80	-17.49

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Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead+Wind 120 deg - Service	39.09	34.89	20.19	1812.55	-3113.45	-11.74
Dead+Wind 150 deg - Service	39.09	19.31	33.49	3016.42	-1733.41	-1.67
Dead+Wind 180 deg - Service	39.09	-0.06	38.09	3431.02	11.23	8.10
Dead+Wind 210 deg - Service	39.09	-19.42	33.55	3021.45	1754.53	15.85
Dead+Wind 240 deg - Service	39.09	-34.95	20.30	1821.27	3130.88	20.18
Dead+Wind 270 deg - Service	39.09	-38.34	0.19	23.86	3424.18	17.49
Dead+Wind 300 deg - Service	39.09	-32.64	-18.74	-1671.34	2917.34	10.95
Dead+Wind 330 deg - Service	39.09	-19.18	-33.26	-2982.69	1722.70	1.88

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
1	0.00	-39.09	0.00	0.00	39.09	0.00	0.000%
2	0.06	-39.09	-40.35	-0.06	39.09	40.35	0.000%
3	19.29	-39.09	-33.32	-19.29	39.09	33.32	0.000%
4	32.71	-39.09	-18.84	-32.71	39.09	18.84	0.000%
5	38.34	-39.09	0.06	-38.34	39.09	-0.06	0.000%
6	34.89	-39.09	20.19	-34.89	39.09	-20.19	0.000%
7	19.31	-39.09	33.49	-19.31	39.09	-33.49	0.000%
8	-0.06	-39.09	38.09	0.06	39.09	-38.09	0.000%
9	-19.42	-39.09	33.55	19.42	39.09	-33.55	0.000%
10	-34.95	-39.09	20.30	34.95	39.09	-20.30	0.000%
11	-38.34	-39.09	0.19	38.34	39.09	-0.19	0.000%
12	-32.64	-39.09	-18.74	32.64	39.09	18.74	0.000%
13	-19.18	-39.09	-33.26	19.18	39.09	33.26	0.000%
14	0.00	-60.75	0.00	-0.00	60.75	-0.00	0.000%
15	0.07	-60.75	-55.37	-0.07	60.75	55.37	0.000%
16	25.57	-60.75	-44.19	-25.57	60.75	44.19	0.000%
17	42.86	-60.75	-24.70	-42.86	60.75	24.70	0.000%
18	50.89	-60.75	0.06	-50.88	60.75	-0.06	0.000%
19	47.90	-60.75	27.70	-47.90	60.75	-27.70	0.000%
20	25.59	-60.75	44.36	-25.59	60.75	-44.36	0.000%
21	-0.07	-60.75	49.81	0.07	60.75	-49.81	0.000%
22	-25.70	-60.75	44.43	25.70	60.75	-44.43	0.000%
23	-47.96	-60.75	27.81	47.96	60.75	-27.81	0.000%
24	-50.89	-60.75	0.20	50.88	60.75	-0.20	0.000%
25	-42.79	-60.75	-24.59	42.79	60.75	24.59	0.000%
26	-25.45	-60.75	-44.12	25.45	60.75	44.12	0.000%
27	0.06	-39.09	-40.35	-0.06	39.09	40.35	0.000%
28	19.29	-39.09	-33.32	-19.29	39.09	33.32	0.000%
29	32.71	-39.09	-18.84	-32.71	39.09	18.84	0.000%
30	38.34	-39.09	0.06	-38.34	39.09	-0.06	0.000%
31	34.89	-39.09	20.19	-34.89	39.09	-20.19	0.000%
32	19.31	-39.09	33.49	-19.31	39.09	-33.49	0.000%
33	-0.06	-39.09	38.09	0.06	39.09	-38.09	0.000%
34	-19.42	-39.09	33.55	19.42	39.09	-33.55	0.000%
35	-34.95	-39.09	20.30	34.95	39.09	-20.30	0.000%
36	-38.34	-39.09	0.19	38.34	39.09	-0.19	0.000%
37	-32.64	-39.09	-18.74	32.64	39.09	18.74	0.000%
38	-19.18	-39.09	-33.26	19.18	39.09	33.26	0.000%

Non-Linear Convergence Results

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Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00000001
3	Yes	4	0.00000001	0.00000001
4	Yes	4	0.00000001	0.00000001
5	Yes	4	0.00000001	0.00000001
6	Yes	4	0.00000001	0.00000001
7	Yes	4	0.00000001	0.00000001
8	Yes	4	0.00000001	0.00000001
9	Yes	4	0.00000001	0.00000001
10	Yes	4	0.00000001	0.00000001
11	Yes	4	0.00000001	0.00000001
12	Yes	4	0.00000001	0.00000001
13	Yes	4	0.00000001	0.00000001
14	Yes	4	0.00000001	0.00000001
15	Yes	4	0.00000001	0.00000229
16	Yes	4	0.00000001	0.00000446
17	Yes	4	0.00000001	0.00000194
18	Yes	4	0.00000001	0.00000527
19	Yes	4	0.00000001	0.00000226
20	Yes	4	0.00000001	0.00000462
21	Yes	4	0.00000001	0.00000199
22	Yes	4	0.00000001	0.00000448
23	Yes	4	0.00000001	0.00000227
24	Yes	4	0.00000001	0.00000526
25	Yes	4	0.00000001	0.00000192
26	Yes	4	0.00000001	0.00000461
27	Yes	4	0.00000001	0.00000001
28	Yes	4	0.00000001	0.00000001
29	Yes	4	0.00000001	0.00000001
30	Yes	4	0.00000001	0.00000001
31	Yes	4	0.00000001	0.00000001
32	Yes	4	0.00000001	0.00000001
33	Yes	4	0.00000001	0.00000001
34	Yes	4	0.00000001	0.00000001
35	Yes	4	0.00000001	0.00000001
36	Yes	4	0.00000001	0.00000001
37	Yes	4	0.00000001	0.00000001
38	Yes	4	0.00000001	0.00000001

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	183 - 163	9.055	27	0.3966	0.0288
T2	163 - 143	7.386	27	0.3854	0.0198
T3	143 - 123	5.764	27	0.3567	0.0108
T4	123 - 103	4.319	27	0.3039	0.0094
T5	103 - 83	3.056	27	0.2645	0.0091
T6	83 - 63	2.026	35	0.2084	0.0087
T7	63 - 43	1.169	35	0.1589	0.0068
T8	43 - 33	0.562	35	0.0997	0.0048
T9	33 - 23	0.345	35	0.0764	0.0037
T10	23 - 3	0.179	35	0.0520	0.0026

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Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
191.00	PD220	27	9.055	0.3966	0.0288	Inf
189.00	2" Dia 8' Omni	27	9.055	0.3966	0.0288	Inf
188.00	10' 2-Bay Dipole	27	9.055	0.3966	0.0288	Inf
183.00	4'x4" Pipe Mount	27	9.055	0.3966	0.0288	Inf
180.00	6 FT DISH	27	8.804	0.3953	0.0275	Inf
176.00	12' Dipole	27	8.470	0.3934	0.0258	842649
164.00	DB586-Y	27	7.469	0.3862	0.0203	245877
160.00	3' Standoff	27	7.136	0.3827	0.0183	100472
156.00	DB586-Y	27	6.806	0.3785	0.0162	54050
149.00	3' Standoff	27	6.237	0.3686	0.0129	29624
148.00	10' 2-Bay Dipole	27	6.157	0.3668	0.0125	27825
143.00	10' 2-Bay Dipole	27	5.764	0.3567	0.0108	22548
138.00	3' Standoff	27	5.385	0.3442	0.0097	23396
135.00	800 10121	27	5.164	0.3360	0.0095	24830
113.00	12' Dipole	27	3.661	0.2843	0.0092	22382
106.00	12' Frame	27	3.231	0.2711	0.0090	18348
91.00	10' Frame	27	2.415	0.2314	0.0091	26189
62.00	GPS	35	1.133	0.1561	0.0067	17098

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	183 - 163	11.924	15	0.5189	0.0336
T2	163 - 143	9.743	15	0.5038	0.0270
T3	143 - 123	7.625	15	0.4670	0.0152
T4	123 - 103	5.733	15	0.3993	0.0114
T5	103 - 83	4.073	15	0.3488	0.0098
T6	83 - 63	2.711	15	0.2762	0.0088
T7	63 - 43	1.570	15	0.2115	0.0068
T8	43 - 33	0.757	15	0.1334	0.0048
T9	33 - 23	0.467	15	0.1023	0.0037
T10	23 - 3	0.243	23	0.0697	0.0026

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
191.00	PD220	15	11.924	0.5189	0.0336	868169
189.00	2" Dia 8' Omni	15	11.924	0.5189	0.0336	868169
188.00	10' 2-Bay Dipole	15	11.924	0.5189	0.0336	868169
183.00	4'x4" Pipe Mount	15	11.924	0.5189	0.0336	868169
180.00	6 FT DISH	15	11.597	0.5171	0.0329	868169
176.00	12' Dipole	15	11.160	0.5146	0.0319	620121
164.00	DB586-Y	15	9.852	0.5048	0.0275	183145
160.00	3' Standoff	15	9.417	0.5003	0.0253	76630

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Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
156.00	DB586-Y	15	8.985	0.4949	0.0229	41683
149.00	3' Standoff	15	8.242	0.4822	0.0185	23013
148.00	10' 2-Bay Dipole	15	8.138	0.4799	0.0179	21612
143.00	10' 2-Bay Dipole	15	7.625	0.4670	0.0152	17516
138.00	3' Standoff	15	7.129	0.4510	0.0132	18234
135.00	800 10121	15	6.839	0.4404	0.0125	19400
113.00	12' Dipole	15	4.868	0.3742	0.0106	17487
106.00	12' Frame	15	4.303	0.3573	0.0100	14286
91.00	10' Frame	15	3.226	0.3061	0.0093	20561
62.00	GPS	15	1.521	0.2079	0.0067	13016

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load K	Ratio Load / Allowable	Allowable Ratio	Criteria
T1	183	Leg	A325N	0.6250	4	1.28	13.50	0.095 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.5000	1	1.60	4.12	0.388 ✓	1.333	Bolt Shear
		Top Girt	A325N	0.5000	1	0.15	4.12	0.036 ✓	1.333	Bolt Shear
T2	163	Leg	A325N	0.7500	4	3.73	19.44	0.192 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.5000	1	2.49	3.17	0.786 ✓	1.333	Member Bearing
T3	143	Leg	A325N	0.8750	4	7.31	26.46	0.276 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.5000	1	4.24	4.12	1.027 ✓	1.333	Bolt Shear
T4	123	Leg	A325N	1.0000	4	11.89	34.55	0.344 ✓	1.333	Bolt Tension
		Diagonal	A325X	0.5000	1	5.57	5.89	0.946 ✓	1.333	Bolt Shear
T5	103	Leg	A325N	1.0000	4	17.10	34.55	0.495 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.7500	1	9.36	9.28	1.008 ✓	1.333	Bolt Shear
T6	83	Leg	A325N	1.0000	4	24.13	34.56	0.698 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.7500	1	10.29	9.06	1.136 ✓	1.333	Member Bearing
T7	63	Leg	A325N	1.0000	6	20.84	34.56	0.603 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.7500	1	11.12	9.28	1.198 ✓	1.333	Bolt Shear
T8	43	Diagonal	A325X	0.7500	1	12.16	13.25	0.918 ✓	1.333	Bolt Shear
T9	33	Leg	A325N	1.0000	6	25.38	34.56	0.734 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.8750	1	12.71	12.63	1.006 ✓	1.333	Bolt Shear
T10	23	Leg	A449	1.0000	6	29.78	31.10	0.958 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.8750	1	14.33	12.63	1.135 ✓	1.333	Bolt Shear

Compression Checks

tnxTower	Job: 12047.CO6 ~ 180-ft Rohn SSV Lattice Tower	Page: 30 of 33
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	Client: SPRINT	Designed by: jrm

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio P / P_a
T1	183 - 163	P2.5x.203	20.00	5.00	63.3 K=1.00	22.141	1.7040	-6.77	37.73	0.179 ✓
T2	163 - 143	P2.5x.276	20.03	6.68	86.7 K=1.00	17.634	2.2535	-17.99	39.74	0.453 ✓
T3	143 - 123	P3x.216	20.04	6.68	68.9 K=1.00	21.145	2.2285	-36.42	47.12	0.773 ✓
T4	123 - 103	P4x.337	20.04	6.68	54.3 K=1.00	23.671	4.4074	-60.80	104.33	0.583 ✓
T5	103 - 83	P5x.258	20.03	10.02	64.0 K=1.00	22.021	4.2999	-91.37	94.69	0.965 ✓
T6	83 - 63	P5x.375	20.03	10.02	65.4 K=1.00	21.782	6.1120	-128.43	133.13	0.965 ✓
T7	63 - 43	P5x.375	20.04	10.02	65.4 K=1.00	21.780	6.1120	-165.16	133.12	1.241 ✓
T8	43 - 33	P6x.432	10.02	10.02	54.8 K=1.00	23.591	8.4049	-182.33	198.28	0.920 ✓
T9	33 - 23	P6x.432	10.02	10.02	54.8 K=1.00	23.591	8.4049	-202.16	198.28	1.020 ✓
T10	23 - 3	P6x.432	20.03	10.02	54.8 K=1.00	23.591	8.4049	-239.09	198.28	1.206 ✓

Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio P / P_a
T1	183 - 163	L1 3/4x1 3/4x3/16	9.91	4.70	164.3 K=1.00	5.530	0.6211	-1.60	3.43	0.466 ✓
T2	163 - 143	L2x2x1/8	12.24	6.06	183.0 K=1.00	4.457	0.4844	-2.49	2.16	1.155 ✓
T3	143 - 123	L2 1/2x2 1/2x3/16	14.02	6.93	167.9 K=1.00	5.295	0.9020	-4.24	4.78	0.887 ✓
T4	123 - 103	L2 1/2x2 1/2x1/4	15.89	7.82	191.0 K=1.00	4.093	1.1900	-5.44	4.87	1.116 ✓
T5	103 - 83	L3X3X3/16 Reinf w/L2.5X2.5X3/16	19.10	9.57	143.2 K=1.00	7.281	3.2137	-9.06	23.40	0.387 ✓
T6	83 - 63	L3 1/2x3 1/2x1/4	20.83	10.29	177.9 K=1.00	4.717	1.6900	-9.84	7.97	1.235 ✓
T7	63 - 43	L3 1/2x3 1/2x3/8	22.67	11.22	196.0 K=1.00	3.888	2.4800	-10.02	9.64	1.039 ✓
T8	43 - 33	L4x4x3/8	23.59	11.62	176.9 K=1.00	4.770	2.8600	-12.16	13.64	0.891 ✓
T9	33 - 23	L4x4x3/8	24.50	12.05	183.5 K=1.00	4.433	2.8600	-10.24	12.68	0.808 ✓
T10	23 - 3	L4x4x3/8	25.41	12.51	190.6 K=1.00	4.113	2.8600	-13.79	11.76	1.173 ✓

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	Client: SPRINT	Designed by: jrm

Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	183 - 163	L2 1/2x2 1/2x3/16	8.56	8.09	196.2 K=1.00	3.881	0.9020	-0.15	3.50	0.043 ✓

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	183 - 163	P2.5x.203	20.00	5.00	63.3	30.000	1.7040	5.11	51.12	0.100 ✓
T2	163 - 143	P2.5x.276	20.03	6.68	86.7	30.000	2.2535	14.94	67.61	0.221 ✓
T3	143 - 123	P3x.216	20.04	6.68	68.9	30.000	2.2285	29.24	66.85	0.437 ✓
T4	123 - 103	P4x.337	20.04	6.68	54.3	30.000	4.4074	47.58	132.22	0.360 ✓
T5	103 - 83	P5x.258	20.03	10.02	64.0	30.000	4.2999	68.40	129.00	0.530 ✓
T6	83 - 63	P5x.375	20.03	10.02	65.4	30.000	6.1120	96.52	183.36	0.526 ✓
T7	63 - 43	P5x.375	20.04	10.02	65.4	30.000	6.1120	125.02	183.36	0.682 ✓
T8	43 - 33	P6x.432	10.02	10.02	54.8	30.000	8.4049	140.49	252.15	0.557 ✓
T9	33 - 23	P6x.432	10.02	10.02	54.8	30.000	8.4049	152.25	252.15	0.604 ✓
T10	23 - 3	P6x.432	20.03	10.02	54.8	30.000	8.4049	178.69	252.15	0.709 ✓

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	183 - 163	L1 3/4x1 3/4x3/16	9.91	4.70	107.7	29.000	0.3779	1.56	10.96	0.142 ✓
T2	163 - 143	L2x2x1/8	12.24	6.06	118.4	29.000	0.3047	2.49	8.84	0.282 ✓
T3	143 - 123	L2 1/2x2 1/2x3/16	14.02	6.93	108.6	29.000	0.5886	4.13	17.07	0.242

tnxTower	Job: 12047.CO6 ~ 180-ft Rohn SSV Lattice Tower	Page: 32 of 33
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	Client: SPRINT	Designed by: jrm

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio P / P_a
T4	123 - 103	L2 1/2x2 1/2x1/4	15.89	7.82	123.7	29.000	0.7753	5.57	22.48	0.248 ✓
T5	103 - 83	L3X3X3/16 Reinf w/L2.5X2.5X3/16	19.10	9.57	143.2	21.600	3.2137	9.36	69.42	0.135 ✓
T6	83 - 63	L3 1/2x3 1/2x1/4	20.83	10.29	114.9	29.000	1.1034	10.29	32.00	0.322 ✓
T7	63 - 43	L3 1/2x3 1/2x3/8	22.67	11.22	127.5	29.000	1.6139	11.12	46.80	0.238 ✓
T8	43 - 33	L4x4x3/8	23.59	11.62	114.8	29.000	1.8989	10.21	55.07	0.185 ✓
T9	33 - 23	L4x4x3/8	24.50	12.05	119.2	29.000	1.8637	12.71	54.05	0.235 ✓
T10	23 - 3	L4x4x3/8	26.33	12.97	128.2	29.000	1.8637	14.33	54.05	0.265 ✓

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio P / P_a
T1	183 - 163	L2 1/2x2 1/2x3/16	8.56	8.09	128.3	29.000	0.5886	0.06	17.07	0.003 ✓

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
T1	183 - 163	Leg	P2.5x.203	3	-6.77	50.29	13.5	Pass
T2	163 - 143	Leg	P2.5x.276	32	-17.99	52.97	34.0	Pass
T3	143 - 123	Leg	P3x.216	53	-36.42	62.81	58.0	Pass
T4	123 - 103	Leg	P4x.337	74	-60.80	139.07	43.7	Pass
T5	103 - 83	Leg	P5x.258	96	-91.37	126.22	72.4	Pass
T6	83 - 63	Leg	P5x.375	111	-128.43	177.46	72.4	Pass
T7	63 - 43	Leg	P5x.375	126	-165.16	177.44	93.1	Pass
T8	43 - 33	Leg	P6x.432	141	-182.33	264.31	69.0	Pass
T9	33 - 23	Leg	P6x.432	150	-202.16	264.31	76.5	Pass
T10	23 - 3	Leg	P6x.432	159	-239.09	264.31	90.5	Pass
T1	183 - 163	Diagonal	L1 3/4x1 3/4x3/16	9	-1.60	4.58	35.0	Pass
T2	163 - 143	Diagonal	L2x2x1/8	36	-2.49	2.88	86.6	Pass
T3	143 - 123	Diagonal	L2 1/2x2 1/2x3/16	57	-4.24	6.37	66.5 77.1 (b)	Pass
T4	123 - 103	Diagonal	L2 1/2x2 1/2x1/4	78	-5.44	6.49	83.7	Pass
T5	103 - 83	Diagonal	L3X3X3/16 Reinf w/L2.5X2.5X3/16	99	-9.06	31.19	29.1 75.6 (b)	Pass
T6	83 - 63	Diagonal	L3 1/2x3 1/2x1/4	114	-9.84	10.63	92.6	Pass
T7	63 - 43	Diagonal	L3 1/2x3 1/2x3/8	129	-10.02	12.85	77.9 89.9 (b)	Pass
T8	43 - 33	Diagonal	L4x4x3/8	144	-12.16	18.19	66.9 68.8 (b)	Pass

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Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
T9	33 - 23	Diagonal	L4x4x3/8	156	-10.24	16.90	60.6 75.5 (b)	Pass
T10	23 - 3	Diagonal	L4x4x3/8	171	-13.79	15.68	88.0	Pass
T1	183 - 163	Top Girt	L2 1/2x2 1/2x3/16	5	-0.15	4.67	3.2	Pass
							Summary	
						Leg (T7)	93.1	Pass
						Diagonal (T6)	92.6	Pass
						Top Girt (T1)	3.2	Pass
						Bolt Checks	89.9	Pass
						RATING =	**93.1**	**Pass**

Program Version 6.0.0.8 - 9/7/2011 File:J:/Jobs/1204700.WI/CO6 - CT03XC383/ERI Files/With Original Bolt Sizes_Revised Grade and Type_09-05-12/180 ROHN SSV Lattice Newton CT.eri

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Subject:	Lattice Tower Foundation Reinforcement Design
Location: Newtown, CT	Sprint CT03XC383
Rev. 0:03/28/13	Prepared by: JRM. Checked by: C.F.C.

Pad and Pier Foundation:

Input Data:

(With AT&T Foundation Reinforcements)

Tower Data

Max Uplift Force =	Uplift := 187·kips	(User Input from RISATower)	(Leg)
Max Shear Force =	Shear := 31·kips	(User Input from RISATower)	(Leg)
Max Compressive Force =	Compression := 246·kips	(User Input from RISATower)	(Leg)
Base Shear =	$Shear_{tot}$:= 55·kips	(User Input from RISATower)	(Tower)
Base Compression =	$Comp_{tot}$:= 61·kips	(User Input from RISATower)	(Tower)
Base Moment =	Moment := 4871·ft·kips	(User Input from RISATower)	(Tower)
Tower Height =	H_t := 180·ft	(User Input)	

Original Foundation Data (Foundation #1): (North East Leg):

Overall Depth of Footing =	D_{f1} := 7.1·ft	(User Input)	Foundation #1. Refer to Sketch SKRAD101498 Sheet 1 of 3 prepared for Connecticut Light and Power Company, dated 10/14/98
Length of Pier =	L_{p1} := 10.0·ft	(User Input)	
Pier Projection Above Grade =	P_{P1} := 4.9·ft	(User Input)	
Width of Pier =	d_{p1} := 2.5·ft	(User Input)	
Pad Width =	PD_{w1} := 10.0·ft	(User Input)	
Pad Thickness =	PD_{t1} := 2.0·ft	(User Input)	

Original Foundation Data (Foundation #2): (South West Leg):

Overall Depth of Footing =	D_{f2} := 8.5·ft	(User Input)	Foundation #2. Refer to Sketch SKRAD101498 Sheet 1 of 3 prepared for Connecticut Light and Power Company, dated 10/14/98
Length of Pier =	L_{p2} := 10.0·ft	(User Input)	
Pier Projection Above Grade =	P_{P2} := 3.5·ft	(User Input)	
Width of Pier =	d_{p2} := 2.5·ft	(User Input)	
Pad Width =	PD_{w2} := 10.0·ft	(User Input)	
Pad Thickness =	PD_{t2} := 2.0·ft	(User Input)	

Original Foundation Data (Foundation #3): (South East Leg):

Overall Depth of Footing =	D_{f3} := 10.75·ft	(User Input)	Foundation #3. Refer to Sketch SKRAD101498 Sheet 1 of 3 prepared for Connecticut Light and Power Company, dated 10/14/98
Length of Pier =	L_{p3} := 10.0·ft	(User Input)	
Pier Projection Above Grade =	P_{P3} := 1.25·ft	(User Input)	
Width of Pier =	d_{p3} := 2.5·ft	(User Input)	
Pad Width =	PD_{w3} := 10.0·ft	(User Input)	
Pad Thickness =	PD_{t3} := 2.0·ft	(User Input)	

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Subject: Lattice Tower Foundation Reinforcement Design

Location: Newtown, CT

Sprint CT03XC383

Rev. 0:03/28/13

Prepared by: JRM.
Checked by: C.F.C.

Material Properties:

Internal Friction Angle of Soil =	$\Phi_s := 34 \cdot deg$	(User Input)	Based on Geotech Report prepared by Clarence Welti & Assoc., INC., dated October 19, 2011
Allowable Soil Bearing Capacity =	$q_s := 6000 \cdot psf$	(User Input)	
Allowable Soil Bearing Capacity =	$q_{suse} := 3000 \cdot psf$	(User Input)	Note: 3000psf used for evaluation of existing concrete at grade and proposed concrete infill for soil bearing condition
Unit Weight of Soil =	$\gamma_s := 125 \cdot pcf$	(User Input)	
Unit Weight of Concrete =	$\gamma_c := 150 \cdot pcf$	(User Input)	
Foundation Bouyancy =	Bouyancy := 0	(User Input)	(Yes=1 / No=0)
Depth to Neglect =	$n := 0 \cdot ft$	(User Input)	
Cohesion of Clay Type Soil =	$c := 0 \cdot ksf$	(User Input)	(Use 0 for Sandy Soil)
Seismic Zone Factor =	Z := 2	(User Input)	(UBC-1997 Fig 23-2)
Coefficient of Friction Between Concrete =	$\mu := 0.45$	(User Input)	

Calculated Factors:

Load Factor =

$$LF := \begin{cases} 1.333 & \text{if } H_t \le 700 \cdot ft \\ 1.7 & \text{if } H_t \ge 1200 \cdot ft \\ 1.333 + \left(\frac{H_t - 700ft}{1200ft - 700ft}\right) \cdot 0.4 & \text{otherwise} \end{cases} = 1.333$$

Calculated Data:

Active Pressure =

$$K_a := \frac{\left(1 - \sin\left(\Phi_s\right)\right)}{\left(1 + \sin\left(\Phi_s\right)\right)} = 0.283$$

$$P_a := \frac{1}{2} \cdot \left(PD_{t1}\right)^2 \cdot PD_{w1} \cdot \gamma_s \cdot K_a = 0.71 \cdot kips$$

Coefficient of Lateral Soil Pressure =

$$K_p := \frac{1 + \sin\left(\Phi_s\right)}{1 - \sin\left(\Phi_s\right)} = 3.537$$

$$P_p := \frac{1}{2} \cdot \left(PD_{t1}\right)^2 \cdot PD_{w1} \cdot \gamma_s \cdot K_p = 8.84 \cdot kips$$

Stability of Footing:

Adjusted Concrete Unit Weight =

$$\gamma_{ac} := if\left(Bouyancy = 1, \gamma_c - 62.4pcf, \gamma_c\right) = 150 \cdot pcf$$

Adjusted Soil Unit Weight =

$$\gamma_{as} := if\left(Bouyancy = 1, \gamma_s - 62.4pcf, \gamma_s\right) = 125 \cdot pcf$$

Cross Sectional Area 1 of Resisting Pyramid =

$$B_1 := PD_{w1}{}^2 = 100ft^2$$

Cross Sectional Area 2 of Resisting Pyramid =

$$B_2 := \left[2\left(L_{p1} - P_{P1} - n\right) \cdot \tan\left(\Phi_s\right) + PD_{w1}\right]^2 = 284.9ft^2$$

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	Subject:	Lattice Tower Foundation Reinforcement Design
	Location: Newtown, CT	Sprint CT03XC383
	Rev. 0:03/28/13	Prepared by: JRM. Checked by: C.F.C.

Volume and Weight of Original Tower Foundation

Foundation #1:

Volume of Concrete = $V_{origconc1} := \left[\left(PD_{w1}^{2} \cdot PD_{t1}\right) + d_{p1}^{2} L_{p1}\right] = 262.5 \cdot ft^3$

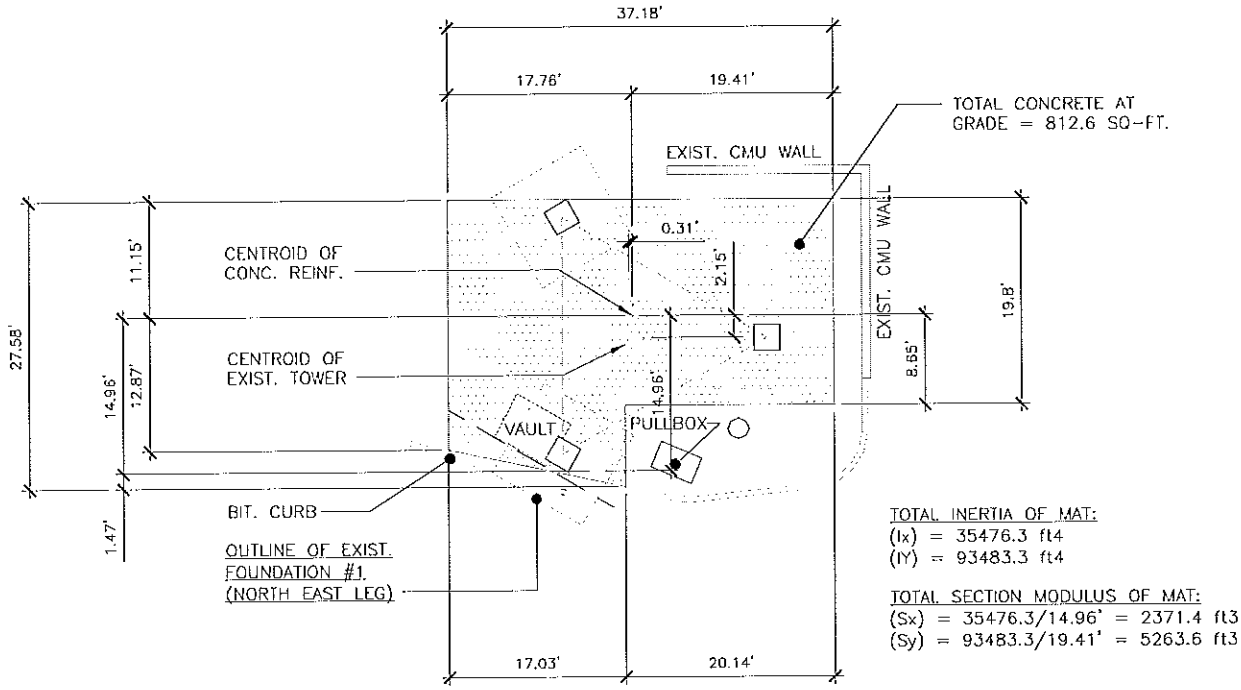
Foundation #2:

Volume of Concrete = $V_{origconc2} := \left[\left(PD_{w2}^{2} \cdot PD_{t2}\right) + d_{p2}^{2} L_{p2}\right] = 262.5 \cdot ft^3$

Foundation #3:

Volume of Concrete = $V_{origconc3} := \left[\left(PD_{w3}^{2} \cdot PD_{t3}\right) + d_{p3}^{2} L_{p3}\right] = 262.5 \cdot ft^3$

Total Weight of Original Concrete = $WT_{origconc} := \left(V_{origconc1} + V_{origconc2} + V_{origconc3}\right) \cdot \gamma_c = 118.1 \cdot kip$



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Volume and Weight of Soil Above Original Footing to Underside of Previous Reinforcement

Foundation #1:

Volume of Soil Above Footing = $V_{soilfnd1} := \left(PD_{w1}^{2} - d_{p1}^{2}\right)\left(L_{p1} - P_{P1}\right) = 478.12 \cdot ft^3$

Foundation #2:

Volume of Soil Above Footing = $V_{soilfnd2} := \left(PD_{w2}^{2} - d_{p2}^{2}\right)\left(L_{p2} - P_{P2}\right) = 609.38 \cdot ft^3$

Foundation #3:

Volume of Soil Above Footing = $V_{soilfnd3} := \left(PD_{w3}^{2} - d_{p3}^{2}\right)\left(L_{p3} - P_{P3}\right) = 820.31 \cdot ft^3$

Total Weight of Soil = $WT_s := \left(V_{soilfnd1} + V_{soilfnd2} + V_{soilfnd3}\right) \cdot \gamma_s = 238.5 \cdot kip$

Volume and Weight of Previous Concrete Reinforcement and Proposed Infill

Foundation #1:

Contact Area of Concrete At Grade = $A_{concfnd1} := \left(102.87ft^2 - 6.25ft^2\right) = 96.62ft^2$

Volume of Concrete At Grade = $V_{concfnd1} := \left(A_{concfnd1} \cdot 6.0ft\right) = 579.72 \cdot ft^3$

Foundation #2:

Contact Area of Concrete At Grade = $A_{concfnd2} := \left(260ft^2 - 6.25ft^2\right) = 253.75ft^2$

Volume of Concrete At Grade = $V_{concfnd2} := \left[\left(A_{concfnd2}\right)4.0ft\right] = 1015 \cdot ft^3$ (Minus pier area)

Foundation #3:

Contact Area of Concrete At Grade = $A_{concfnd3} := \left(169ft^2 - 6.25ft^2\right) = 162.75ft^2$

Volume of Concrete At Grade = $V_{concfnd3} := \left[\left(A_{concfnd3}\right)4.5ft\right] = 732.38 \cdot ft^3$

Area of Existing Reinforced Concrete At Grade = $A_{origreinf} := \left(A_{concfnd1} + A_{concfnd2} + A_{concfnd3}\right) = 513.1 \cdot ft^2$

Area of Proposed Reinforced Concrete Infill = $A_{reinfprop} := 255ft^2$

Average Depth of Mat (Existing and Proposed Infill) = $Mat_t := 4.0ft$

Area of Proposed Reinforced Concrete Infill = $A_{mattot} := A_{origreinf} + A_{reinfprop} = 768.1ft^2$

Weight of Concrete At Grade (Proposed Infill) = $WT_{concgrade} := \left(V_{concfnd1} + V_{concfnd2} + V_{concfnd3}\right) \cdot \gamma_c = 349.1 \cdot kip$

Weight of Concrete At Grade (Proposed Infill) = $WT_{concgradeinfill} := \left[\left(A_{reinfprop}\right)Mat_t\right] \cdot \gamma_c = 153 \cdot kip$

Total Weight of Concrete At Grade = $WT_{concgradetot} := \left(WT_{concgrade} + WT_{concgradeinfill}\right) = 502.1 \cdot kip$

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Subject:		Lattice Tower Foundation Reinforcement Design
Location: Newtown, CT		Sprint CT03XC383
Rev. 0:03/28/13		Prepared by: JRM. Checked by: C.F.C.

Total Weight of Original Concrete Foundation System (x3), Soil, Previous Concrete Reinforcement and Proposed R.C. Infill

Total Weight = $WT_{tot} := WT_{origconc} + WT_s + WT_{concgradetot} = 858.7 \cdot kip$

Soil Bearing Pressure:

Section Modulus of Mat = $S := 2274.5ft^3$ (Calculated external of program)

Minimum Distance From Tower Centroid to Edge of Mat at Foundation #1 (North East leg) = $y1 := 14.62ft$ (Calculated external of program)

Minimum Distance From Reinforced Mat Centroid to Edge of Mat at Foundation #1 (North East leg) = $y2 := 16.83ft$ (Shortest Lever Arm Calculated external of program)

Maximum Pressure Under Mat = $P_{max} := \frac{WT_{tot} - WT_{origconc} - WT_s + Comp_{tot}}{A_{mattot}} + \frac{Shear_{tot} \cdot (Mat_t)}{S} = 0.83 \cdot ksf$

$Max\_Pressure\_Check := if(P_{max} < q_{suse}, "Okay", "No Good")$

$Max\_Pressure\_Check = "Okay"$

Minimum Pressure Under Mat = $P_{min} := \frac{WT_{tot} - WT_{origconc} - WT_s + Comp_{tot}}{A_{mattot}} - \frac{Shear_{tot} \cdot (Mat_t)}{S} = 0.64 \cdot ksf$

$Min\_Pressure\_Check := if[(P_{min} \geq 0) \cdot (P_{min} < q_{suse}), "Okay", "No Good"]$

$Min\_Pressure\_Check = "Okay"$

Overturning Moment Check:

Overturning Moment = $M_{ot} := Moment + Shear_{tot} \cdot (Mat_t) = 5091 \cdot kip \cdot ft$

Resisting Moment = $M_r := (WT_{origconc} + WT_s) \cdot y1 + (WT_{concgradetot} \cdot y2) = 13663.3 ft \cdot kips$

Factor of Safety = $\frac{M_r}{M_{ot}} = 2.68$

$Overturning\_Moment := if\left(\frac{M_r}{M_{ot}} > 2, "OK", "NG"\right)$

$Overturning\_Moment = "OK"$

		Market	Southern Connecticut		
		Cascade ID	CT03XC383		
			SECTOR 1	SECTOR 2	SECTOR 3
	Split sector present		No	No	No
1900	1900MHz_Azimuth		340	70	260
1900	1900MHz_No_of_Antennas		1	1	1
1900	1900MHz_RADCenter(ft)		90.3	90.3	90.3
1900	1900MHz_Antenna Make		RFS	RFS	Powerwave
1900	1900MHz_Antenna Model		APXVSPP18-C-A20	APXVSPP18-C-A20	P40-16-XLPP-RR-A
1900	1900MHz_Horizontal_Beamwidth		65	65	40
1900	1900MHz_Vertical_Beamwidth		5.5	5.5	6.5
1900	1900MHz_AntennaHeight (ft)		6	6	4.5
1900	1900MHz_AntennaGain(dBd)		15.9	15.9	15.9
1900	1900MHz_E_Tilt		0	0	-1
1900	1900MHz _M_Tilt		0	0	0
1900	1900MHz_Carrier_Forecast_Year_2013		2	2	2
1900	1900MHz_RRH Manufacturer		ALU	ALU	ALU
1900	1900MHz_RRH Model		RRH 1900 4X45 65MHz	RRH 1900 4X45 65MHz	RRH 1900 4X45 65MHz
1900	1900MHz_RRH Count		1	1	1
1900	1900MHz_RRH Location		Top of the Pole/Tower	Top of the Pole/Tower	Top of the Pole/Tower
1900	1900MHz Combiner Model		No Combiner Required	No Combiner Required	No Combiner Required
1900	1900MHz_Top_Jumper #1_Length (RRH or Combiner-to-Antenna for TT or Main Coax to		10	10	10
1900	1900MHz_Top_Jumper #1_Cable_Model (RRH or Combiner-to-Antenna for TT or Main		LCF12-50J	LCF12-50J	LCF12-50J
1900	1900MHz_Top_Jumper #2_Length (RRH to Combiner for TT if applicable, ft)		N/A	N/A	N/A
1900	1900MHz_Top_Jumper #2_Cable_Model (RRH to Combiner for TT if applicable)		N/A	N/A	N/A
1900	1900MHz_Main_Coax_Cable_Length (ft)		N/A	N/A	N/A
1900	1900MHz_Main_Coax_Cable_Model		N/A	N/A	N/A
1900	1900MHz_Bottom_Jumper #1_Length (Ground based RRH to Combiner-OR-Main Coax, ft)		N/A	N/A	N/A
1900	1900MHz_Bottom_Jumper #1_Cable_Model (Ground based RRH to Combiner-OR-Main		N/A	N/A	N/A
1900	1900MHz_Bottom_Jumper #2_Length (Ground based-Combiner to Main Coax, ft)		N/A	N/A	N/A
1900	1900MHz_Bottom_Jumper #2_Cable_Model (Ground based-Combiner to Main Coax)		N/A	N/A	N/A
800	800MHz_Azimuth		340	70	260
800	800MHz_No_of_Antennas		0	0	0
800	800MHz_RADCenter(ft)		90.3	90.3	90.3
800	800MHz_AntennaMake		RFS	RFS	RFS
800	800MHz_AntennaModel		APXVSPP18-C-A20 (Shared w/1900)	APXVSPP18-C-A20 (Shared w/1900)	P40-16-XLPP-RR-A (Shared w/1900)
800	800MHz_Horizontal_Beamwidth		65	65	40
800	800MHz_Vertical_Beamwidth		11.5	11.5	16
800	800MHz_AntennaHeight (ft)		6	6	4.5
800	800MHz_AntennaGain (dBd)		13.4	13.4	14.2
800	800MHz_E_Tilt		-1	-4	-2
800	800MHz_M_Tilt		0	0	0
800	800MHz_RRH Manufacturer		ALU	ALU	ALU
800	800MHz_RRH Model		RRH 800 MHz 2x50W	RRH 800 MHz 2x50W	RRH 800 MHz 2x50W
800	800MHz_RRH Count		1	1	1
800	800MHz_RRH Location		Top of the Pole/Tower	Top of the Pole/Tower	Top of the Pole/Tower
800	800_Top_Jumper #1_Length (RRH to Antenna for TT or Main Coax to Antenna for GM)		10	10	10
800	800_Top_Jumper_Cable_Model (RRH to Antenna for TT or Main Coax to Antenna for GM)		LCF12-50J	LCF12-50J	LCF12-50J
800	800MHz_Main_Coax_Cable_Length (ft)		N/A	N/A	N/A
800	800MHz_Main_Coax_Cable_Model		N/A	N/A	N/A
800	800_Bottom_Jumper #1_Length (Ground based RRH to Main Coax)		N/A	N/A	N/A
800	800_Bottom_Jumper #1_Cable_Model (Ground based RRH to Main Coax)		N/A	N/A	N/A
	Plumbing Scenario *		124	124	131
Comments	* If plumbing scenario does not match the material received, please contact your Construction Manager				
Comments	11/9/2012				

DR. CLARENCE WELTI, P.E., P.C.

GEOTECHNICAL ENGINEERING

227 Williams Street • P.O. Box 397
Glastonbury, CT 06033-0397

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October 19, 2011

Mr. Dan Bolan
Centek Engineering
63-2 North Branford Road
Branford, CT 06405

Ref: Geotechnical Study for Evaluation of Existing Tower Foundation at NEU Service Center 20 Barnabas Road, Newtown, CT

Dear Mr. Bolan:

1.0 Herewith is the data from the test boring taken at the above referenced site. One boring was taken about 5 feet from the one of the existing tower leg foundations. The boring was drilled to a depth of depth of 32 feet. *The boring was drilled by Clarence Welti Associates, Inc. and sampling was conducted by this firm solely to obtain indications of subsurface conditions as part of a geotechnical exploration program. No services were performed to evaluate subsurface environmental conditions.*

2.0 The boring was taken to provide soils properties and foundation design parameters to evaluate the adequacy of existing lattice tower foundation with an increase in loading on the structure. The foundation plans (1991) show the original tower foundation design included a 10'x10' footing and 24" sq pier supporting each of the 3 tower legs. The bottom of the footings are shown at 9.5 feet below the finished grades. A subsequent foundation plan (1998) shows modifications to the existing foundations to provide additional weight to resist overturning, presumably to address a increase in tower loading or changes in tower design requirements.

3.0 The **Soils Cross Section** from the borings is generally as follows:

Topsoil to 13"

FILL; fine to coarse SAND, little Silt and Gravel to 10.5 feet, medium compact

SILT, some fine SAND, trace Gravel to 26 feet, medium compact

Fine SAND and SILT, little Gravel to 32+ feet, dense

3.1 The **Ground Water Table** was at 13 feet below the existing grade at the completion of the

borings. The soils below about 10 feet were saturated. The recommended design water table is at 10 feet below existing grades.

4.0 In general the criteria for tower support is that the foundation capacity would exceed the loads, which might collapse the tower. **Movements from strains in the soils should be limited to differential settlement (or lateral movements of less than ½").**

5.0 The following is a **summary the soil properties and design values which can be used to evaluate the existing tower foundation design.**

Soil Property/Parameter	Value
Soil Unit Weight (Backfill)	125 pcf
Soil Unit Weight (Natural)	125 pcf
Soil Unit Weight Submerged (Natural)	65 pcf
Angle of Internal Friction (φ)	34°
Cohesion	0
Pull Out Angle from Vertical	30°
Sliding Coefficient	0.6
Allowable Soil Bearing Pressure on the natural soil at 9.5± feet below grade	3 Tons/sf

6.0 The soils at the subject site are generally in OSHA class C which would require excavations that are in excess of 5 feet to have slopes which are less than 34° (i.e., 1.5H to1.0V).

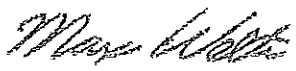
7.0 This report has been prepared for specific a application to the subject project in accordance with generally accepted soil and foundation engineering practices. No other warranty, express or implied, is made. In the event that any changes in the nature, design and location of structures are planned, the conclusions and recommendations contained in this report should not be considered valid unless the changes are reviewed and conclusions of this report modified or verified in writing.

The analyses and recommendations submitted in this report are based in part upon data obtained from referenced explorations. The extent of variations between explorations may not become evident until construction. If variations then appear evident, it will be necessary to re-evaluate the recommendations of this report.

Dr. Clarence Welti, P.E., P.C., should perform a general review of the final design and specifications in order that geotechnical design recommendations may be properly interpreted and implemented as they were intended.

If you have any questions please call me.

Very truly yours,



Max Welti, P. E.

CLARENCE WELTI ASSOC., INC.
P.O. BOX 397
GLASTONBURY, CONN 06033

CLIENT
CENTEK ENGINEERING

PROJECT NAME
TOWER @ NEU SERVICE CENTER
LOCATION
20 BARNABAS RD., NEWTOWN, CT.

	AUGER	CASING	SAMPLER	CORE BAR.
TYPE	HSA		SS	
SIZE I.D.	3.75"		1.375"	
HAMMER WT.			140 lbs	
HAMMER FALL			30"	

OFFSET: 5' OFF PIER
LINE & STA.:
N. COORDINATE:
E. COORDINATE:

SURFACE ELEV.:
HOLE NO. B-1

GROUND WATER OBSERVATIONS
AT 13.0 FT. AFTER 0 HOURS
AT FT. AFTER HOURS

START DATE 10/14/11
FINISH DATE 10/14/11

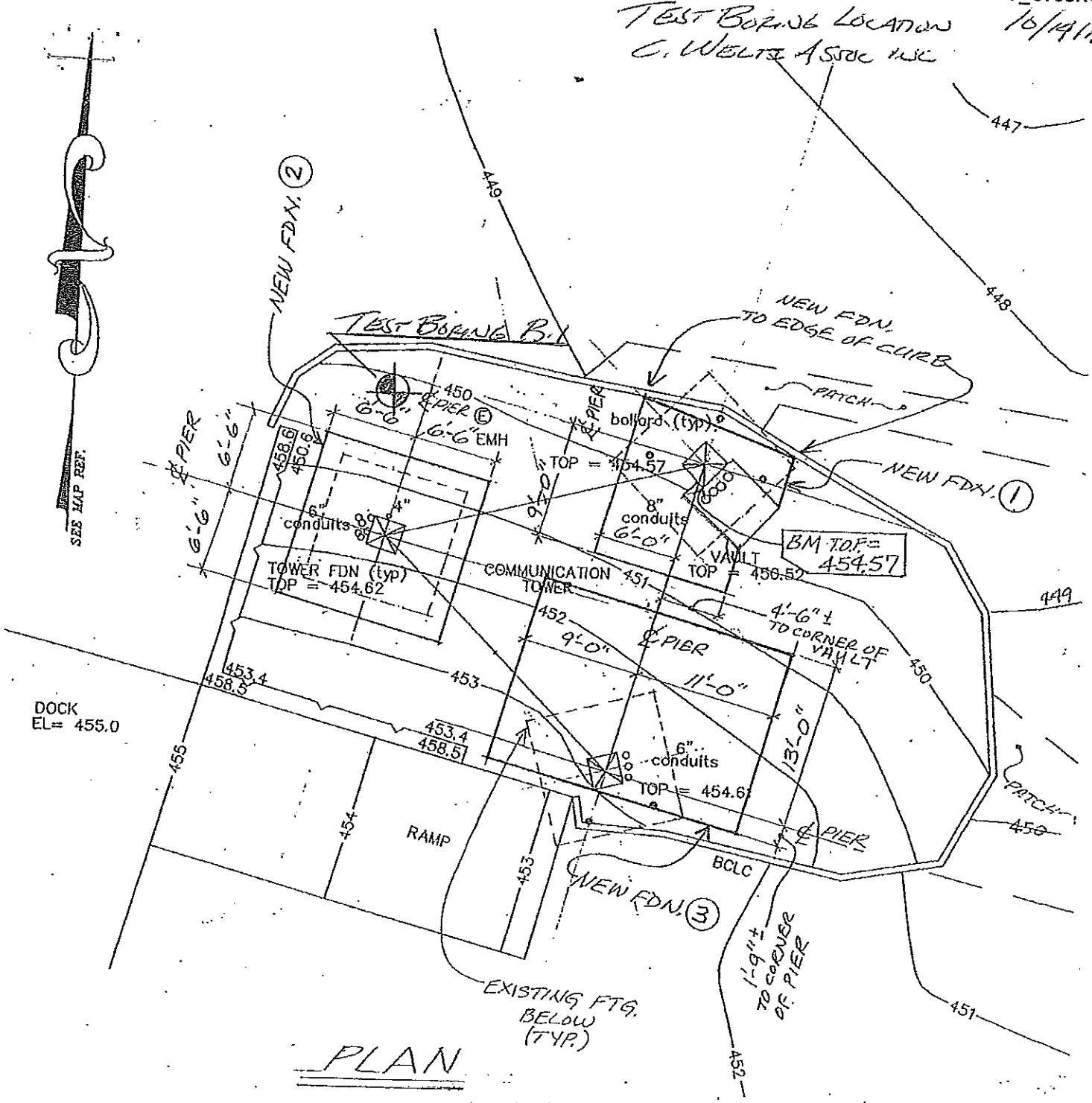
DEPTH	SAMPLE NO.	BLOWS/6"	DEPTH	A	STRATUM DESCRIPTION + REMARKS	ELEV.
0					TOPSOIL	
					BR. FINE-CRS. SAND, LITTLE SILT & GRAVEL - FILL 1.1	
5	1	9-11-11-11	5.00'-7.00'			
10	2	2-8-8-9	10.00'-12.00'		GREY SILT, SOME FINE SAND, TRACE GRAVEL 10.5	
15	3	5-7-10-9	15.00'-17.00'			
20	4	4-5-8-10	20.00'-22.00'			
25	5	9-15-27-25	25.00'-27.00'		GREY FINE SAND AND SILT, LITTLE GRAVEL 26.0	
30	6	9-15-19-23	30.00'-32.00'			
35					BOTTOM OF BORING @ 32.0' 32.0	

LEGEND: COL. A:RECOVERY "
SAMPLE TYPE: D=DRY A=AUGER C=CORE U=UNDISTURBED PISTON S=SPLIT SPOON
PROPORTIONS USED: TRACE=0-10% LITTLE=10-20% SOME=20-35% AND=35-50%

DRILLER: J. BREWER
INSPECTOR:

SHEET 1 OF 1 | HOLE NO. B-1

NV_CT03XC383



PLAN

THE CONNECTICUT LIGHT & POWER COMPANY
MICROWAVE TOWER FOUNDATION MODIFICATIONS
AT NEWTOWN SERVICE CENTER FOR OMNIPOINT ANTENNAS
R. Drasdis 10/14/98 Sketch SKRAD101498, Sht. 1 of 3

GRAPHIC SCALE

0 0 5 10 20 40

(IN FEET)
1 inch = 10 ft.

Connecticut
Light & Power
The Northeast Utilities System

Northeast Utilities Service Company

P.O.Box 270

Hartford, CT 06141-0270

860-665-5000

December 22, 2013

Sprint PCS Wireless Site Ref. CT03XC383 Hawleyville

20 Barnabas Road, Newtown, CT. 06470

CENTEK Engineering Structural Analysis Project # 12047.CO6, Dated: March 28,2013

Salient Architects, LLC. Construction Drawings Dated: 11/27/13

Northeast Utilities has "approved" all modification plans submitted by Sprint PCS for their proposed installation of replacement antennas, remote radio heads and associated ground equipment for the above mentioned tower owned by Northeast Utilities.

Steven J. Florio 12/22/13

860-665-5611 (office)

860-655-7943 (cell)

steven.florio@nu.com

Northeast Utilities

Telecommunication Engineering

EBI Consulting
environmental | engineering | due diligence

RADIO FREQUENCY EMISSIONS ANALYSIS REPORT
EVALUATION OF HUMAN EXPOSURE POTENTIAL TO NON-IONIZING EMISSIONS

Sprint Existing Facility

Site ID: CT03XC383

Newtown / Hawleyville
20 Barnabas Road
Newtown, CT 06470

October 25, 2013

EBI Project Number: 69131177

21 B Street · Burlington, MA 01803 · Tel: (781) 273.2500 · Fax: (781) 273.3311

EBI Consulting
environmental | engineering | due diligence

October 25, 2013

Sprint
Attn: RF Engineering Manager
1 International Boulevard, Suite 800
Mahwah, NJ 07495

Re: Emissions Values for Site: **CT03XC383 – Newtown / Hawleyville**

EBI Consulting was directed to analyze the proposed upgrades to the existing Sprint facility located at 20 Barnabas Road, Newtown, CT, for the purpose of determining whether the emissions from the proposed Sprint equipment upgrades on this property are within specified federal limits.

All information used in this report was analyzed as a percentage of current Maximum Permissible Exposure (% MPE) as listed in the FCC OET Bulletin 65 Edition 97-01and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter (μW/cm2). The number of μW/cm2 calculated at each sample point is called the power density. The exposure limit for power density varies depending upon the frequencies being utilized. Wireless Carriers and Paging Services use different frequency bands each with different exposure limits, therefore it is necessary to report results and limits in terms of percent MPE rather than power density.

All results were compared to the FCC (Federal Communications Commission) radio frequency exposure rules, 47 CFR 1.1307(b)(1) – (b)(3), to determine compliance with the Maximum Permissible Exposure (MPE) limits for General Population/Uncontrolled environments as defined below.

General population/uncontrolled exposure limits apply to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Therefore, members of the general public would always be considered under this category when exposure is not employment related, for example, in the case of a telecommunications tower that exposes persons in a nearby residential area.

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu W/cm^2$). The general population exposure limit for the cellular band is approximately 567 $\mu W/cm^2$, and the general population exposure limit for the PCS band is 1000 $\mu W/cm^2$. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.

Occupational/controlled exposure limits apply to situations in which persons are exposed as a consequence of their employment and in which those persons who are exposed have been made fully aware of the potential for exposure and can exercise control over their exposure. Occupational/controlled exposure limits also apply where exposure is of a transient nature as a result of incidental passage through a location where exposure levels may be above general population/uncontrolled limits (see below), as long as the exposed person has been made fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed upgrades to the existing Sprint Wireless antenna facility located at 20 Barnabas Road, Newtown, CT, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. All calculations were performed assuming the main lobe of the antenna was focused at the base of the tower to present a worst case scenario. Actual values seen from this site will be dramatically less than those shown in this report. For this report the sample point is the top of a 6 foot person standing at the base of the tower.

For all calculations, all emissions were calculated using the following assumptions:

1) 2 CDMA Carriers (1900 MHz) were considered for each sector of the proposed installation.
2) 1 CDMA Carrier (850 MHz) was considered for each sector of the proposed installation
3) All radios at the proposed installation were considered to be running at full power and were uncombined in their RF transmissions paths per carrier prescribed configuration. Per FCC OET Bulletin No. 65 - Edition 97-01 recommendations to achieve the maximum anticipated value at each sample point, all power levels emitting from the proposed antenna installation are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. This is rarely the case, and if so, is never continuous.
4) For the following calculations the sample point was the top of a six foot person standing at the base of the tower. The actual gain in this direction was used per the manufactures supplied specifications.
5) The antenna used in this modeling is the RFS APXVSPP18-C-A20 and the KMW ET-X-TU-42-15-37-18-iR-RA. This is based on feedback from the carrier with regards to anticipated antenna selection. The RFS APXVSPP18-C-A20 has a 15.9 dBd gain value at its main lobe at 1900 MHz and 13.4 dBd at its main lobe for 850 MHz. The KMW ET-X-TU-42-15-37-18-iR-RA has a 18 dBd gain value at its main lobe at 1900 MHz and 15.5 dBd at its main lobe for 850 MHz. All calculations were performed assuming the main lobe of the antenna was focused at the base of the tower to present a worst case scenario.

6) The antenna mounting height centerline of the proposed antennas is **91 feet** above ground level (AGL)
7) Emissions values for additional carriers were taken from the Connecticut Siting Council active database. Values in this database are provided by the individual carriers themselves.

All calculation were done with respect to uncontrolled / general public threshold limits

Site ID	CT03XC383 - Newtown / Hawleyville
Site Addresss	20 Barnabas Road, Newtown, CT, 06470
Site Type	Self Support Tower

Sector 1

Antenna Number	Antenna Make	Antenna Model	Radio Type	Frequency Band	Technology	Power Out Per Channel (Watts)	Number of Channels	Composite Power	Antenna Gain in direction of sample point (dBd)	Antenna Height (ft)	analysis height	Cable Size	Cable Loss (dB)	Additional Loss	ERP	Power Density Value	Power Density Percentage
1a	RFS	APXVSPP18-C-A20	RRH	1900 MHz	CDMA / LTE	20	2	40	15.9	91	85	1/2 "	0.5	0	1386.9474	69.01256	6.90126%
1a	RFS	APXVSPP18-C-A20	RRH	850 MHz	CDMA / LTE	20	1	20	13.4	91	85	1/2 "	0.5	0	389.96892	19.40431	3.42228%
														Sector total Power Density Value:		10.324%	

Sector 2

Antenna Number	Antenna Make	Antenna Model	Radio Type	Frequency Band	Technology	Power Out Per Channel (Watts)	Number of Channels	Composite Power	Antenna Gain in direction of sample point (dBd)	Antenna Height (ft)	analysis height	Cable Size	Cable Loss (dB)	Additional Loss	ERP	Power Density Value	Power Density Percentage
2a	RFS	APXVSPP18-C-A20	RRH	1900 MHz	CDMA / LTE	20	2	40	15.9	91	85	1/2 "	0.5	0	1386.9474	69.01256	6.90126%
2a	RFS	APXVSPP18-C-A20	RRH	850 MHz	CDMA / LTE	20	1	20	13.4	91	85	1/2 "	0.5	0	389.96892	19.40431	3.42228%
														Sector total Power Density Value:		10.324%	

Sector 3

Antenna Number	Antenna Make	Antenna Model	Radio Type	Frequency Band	Technology	Power Out Per Channel (Watts)	Number of Channels	Composite Power	Antenna Gain in direction of sample point (dBd)	Antenna Height (ft)	analysis height	Cable Size	Cable Loss (dB)	Additional Loss	ERP	Power Density Value	Power Density Percentage
3a	KMW	ET-X-TU-42-15-37-18-IR-RA	RRH	1900 MHz	CDMA / LTE	20	2	40	18	91	85	1/2 "	0.5	0	2249.3653	111.9253	11.19253%
3a	KMW	ET-X-TU-42-15-37-18-IR-RA	RRH	850 MHz	CDMA / LTE	20	1	20	15.5	91	85	1/2 "	0.5	0	632.45553	31.4701	5.55028%
														Sector total Power Density Value:		16.743%	

Site Composite MPE %	
Carrier	MPE %
Sprint	37.390%
Nextel	4.710%
AT&T	13.170%
T-Mobile	0.440%
6755 MHz system	0.000%
37.48, 37.74, 48.34, 154.46375 MHz systems	4.800%
Total Site MPE %	**60.510%**

EBI Consulting
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Summary

All calculations performed for this analysis yielded results that were well within the allowable limits for general public exposure to RF Emissions.

The anticipated Maximum Composite contributions from the Sprint facility are **37.390% (10.324% each from sectors 1 and 2 as well as 16.743% from sector 3)** of the allowable FCC established general public limit considering all three sectors simultaneously sampled at the ground level.

The anticipated composite MPE value for this site assuming all carriers present is **60.510%** of the allowable FCC established general public limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions

FCC guidelines state that if a site is found to be out of compliance (over allowable thresholds), that carriers over a 5% contribution to the composite value will require measures to bring the site into compliance. For this facility, the composite values calculated were well within the allowable 100% threshold standard per the federal government.

Scott Heffernan
RF Engineering Director

EBI Consulting
21 B Street
Burlington, MA 01803